SCIENCE AND INDUSTRY

Contractors and Engineers Monthly

Vol. 38, No. 2 FEBRUARY, 1941 $2 a Year, 20 Cents a Copy

Highlights Of This Issue

- **Dual Pumps for Concrete**

  The subcontractor for the concreting at Franklin Falls Dam, N. H., part of the U.S.E.D. flood-control program in New England, used truck-mixed concrete pumped into the wood forms through an 8-inch pipeline a maximum distance of 800 feet. See page 2.

- **Grading Shale and Rock**

  On a 410,345-cubic yard grading contract, mostly shale and rock, near Kittanning, Penna., the contractor had to meet the problems of difficult rock and long hauls, but good organization and a 24-hour a day schedule resulted in a finished grade ready for paving within the time allowed. See page 2.

- **Widening Important Roads**

  Traffic on the Gov. Printz Boulevard, north of Wilmington, Dela., constructed as a relief highway for U. S. 13, soon exceeded the capacity of the original roadway so in 1940 this highway was widened to four lanes. See page 7.

- **Vermont Underpass Troubles**

  In the construction of an underpass and retaining wall at Bethel, Vt., the contractor ran into many difficulties, including poor clay, rock and boulders, an old corduroy road and the necessity of a cessation of work while the retaining wall was redesigned. But the job was completed in 50 working days. See page 11.

- **Airport Surfacing**

  The methods and equipment used for the construction of the runways of a new airport at Calgary, Canada, a link in the chain of defense and training airports being constructed by our neighbor on the north, are described in this issue. See page 13.

- **Award Winner's Job**

  A description of a 7.157-mile roadside-development project in Oklahoma, for his work on which W. A. Corbett won both the Southern Section and National Roadside Development Awards for 1940, appears in this issue. See page 20.

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C. & E. M. Photo
The first step in mixing, pulling the stone to the center of the road, on a rural highway road-mix project in Montgomery County, Ky.

Road-Mix Methods In Kentucky County

Montgomery County Uses Own Road Machines, WPA Labor and Stone On Road Between U.S. 60 and Ky. 40

(*Photos on page* 48)

✦ A Rural Highway Project 5 miles in length for which the County furnished the equipment and machine operators, the State furnished the asphalt, and WPA the stone and labor, was completed by Montgomery County, Ky., in August, 1940, on the Grassy Lick Road connecting two major east and west highways,

(*Concluded on page* 8)

National Defense Increases Importance Of Snow-Free Roads

By WARREN K. MYERS,
Assistant Chief Maintenance Engineer,
Pennsylvania Department of Highways

(*Photo on page* 48)

Country's Security Depends On Uninterrupted Flow of Supplies Made Possible by Efficient Snow Removal

✦ NOW that the National Defense Program has been moved up to the status of an emergency, the use of highways for the transportation of raw materials and manufactured products has reached a new importance, and increased production required to meet present demands for raw material and manufactured products has increased the demands for highway service. Formerly, highways supplemented railroads as a transportation medium; today, with the construction of military and naval reservations and defense industrial plants in areas not completely served by railroads, and with the demand for the rapid movement of troops and shipments of materials, highway transportation takes its place as the Number 1 medium of transportation.

Pennsylvania is one of the leading industrial states and, as such, holds an important place in the National Defense Program. This state supplies such raw materials as oil, coal, lumber and agricultural products. It has factories for the production of iron, steel, electrical machinery, tools, automotive equipment, aircraft, optical goods and petroleum products, and also has a very large navy yard at Philadelphia and other important ship-building yards. It has arsenals and munition and fire-arm factories. There are cantonments and military reservations, such as the Indiantown Gap Reservation where 20,000 men will be trained, the Carlisle Barracks, Marsh Run Supply Depot and the Middletown Airport, located in central Pennsylvania.

While the improvement of roads in the vicinity of military and naval reservations and to sites of defense industries is required immediately, the improvement of the main highway system is not imminent. However, if the present highways are to deliver adequate service, careful attention must be given to their maintenance, which includes the necessary repairs to the road metal as well as keeping the roads open for the uninterrupted flow of traffic at all times. During the winter months the removal of snow and the placing of anti-skid materials are the major operations.

Snow removal is the product of the delays encountered during the days of the first World War when the shortage

(*Continued on page* 26)

NEW BRIDGE ON RELOCATION OF U.S. 40 IN MARYLAND, ONE OF OUR MAJOR DEFENSE HIGHWAYS

The Susquehanna River Bridge, part of a relocation project on U. S.-Maryland Route 40. See page 15.

Truck-Mixed Concrete Pumped to Wood Forms

Concrete Subcontractor At Franklin Falls Dam Uses Many Novel Methods For Solving Placement Problems

(*Photo on page* 48)

✦ THE Great Lakes Dredge & Dock Co. of Chicago, Illinois, is subcontractor for all concrete work on the Franklin Falls flood-control dam on the Pemigewasset River just north of Franklin, N. H. The huge earth dam is being built by Coleman Brothers Corp. of Boston, Mass., with the spillway, conduit, stilling basins and gate-house concrete operations being done by Great Lakes.

Material Delivery

Coleman Bros. Corp. produced all the aggregate required for concrete at the big temporary Kennedy-Van Saun crushing, screening and washing plant described in detail in the November issue of CONTRACTORS AND ENGINEERS MONTHLY, and delivered two sizes of crushed gravel to stockpiles on the hill above the batching plant. Stockpiling was required by the specifications to provide aggregate of uniform moisture content. The stockpiles were greatly increased in size during the late summer and early autumn as freezing temperatures had shown that it would be impossible to operate the gravel plant late into the winter because of troubles with the belts freezing to the idlers.

A Link-Belt crane with a 60-foot boom and a 1-yard Blaw-Knox Dreadnaught clamshell bucket moves the four sizes of aggregate from the stockpile to hoppers above the 150-foot 24-inch Barber-Greene conveyor belt operating on a down grade of 15 per cent. One compartment is used for the delivery of the two sizes of sand and the other, which has a rail grizzly with a 6-inch opening, is used for the two sizes of stone. Each hopper is filled with the size of sand or gravel needed next at the batching plant, which is delivered to the belt by a horizontal sliding gate beneath the hopper. A swinging flap made of a piece of rubber belt with a frame of 1 x 2-inch lumber keeps the stone from jumping as it hits the belt and thus saves much stone and also prevents accidents, and the same flap also smooths out the sand as it is delivered to the belt.

At the top of the batching plant in the valley below is a rotating turret turned by an endless cable operated by a large hand wheel at the top of the belt conveyor. Thus, one man at the top of the conveyor controls the discharge of the specific type and size of aggregate to the belt conveyor and sees that it is delivered to the proper one of the four aggregate bins in the batcher plant. This same man also controls the delivery of the bulk cement from the hopper to which it is delivered by covered trucks from the 1,534-barrel cement storage silo which Great Lakes maintains at the freight yard 3 miles distant. One man works on top of the aggregate piles spotting the trucks, another operates the crane, and a third works at the top of the belt conveyor and spiral cement conveyor.

The bulk cement is carried down to the bulk-cement storage hopper at the batcher plant by two flights of 9-inch diameter screws, each 75 feet long. There is a drop of about 3 feet between the lower end of the upper flight and the top of the lower screw.

The return of the conveyor belt with its idlers is protected by a continuous arched sheet metal cover to lengthen the life of the belt and idlers.

Batching Operations

The enclosed batching plant is a complete Butler unit for two sizes of screened crushed gravel, two sizes of sand and bulk cement. A single Kron dial scale is used for cumulative weighing of the aggregate, and a second Kron dial scale for the cement batching. Control of batching of the aggregate is by means of four long hand-operated levers over the batch-man's head. The batching of water is started by throwing a lever on the control-panel back, and is stopped automatically. The water is discharged to the truck mixers by pulling the same lever to a forward position. Three buttons on the control panel operate to discharge the cement batcher and to discharge the aggregates from the weighing batcher.

The care which is taken to control the weights of aggregates in the two classes of concrete used with the redesigned batches makes it necessary to have four weight set-ups for two classes of concrete. Considerable variations in the character of the materials as delivered from the processing plant make these variations in weight necessary, and at times the amount of cement is increased slightly when the regular tests of the aggregates show a higher surface area. This is done so that the aggregate will be thoroughly coated with cement grout,

(*Continued on page* 16)

C. & E. M. Photo
A 150-foot Barber-Greene belt conveyor carries the aggregate from the hoppers at the top of the bank to the Butler batching plant.

C. & E. M. Photo
Two methods of hauling to the 119,000-yard fill on Ralph Myers' 2.09-mile grading and paving contract near Kittanning, Penna.

Series of Big Cuts On Pennsylvania Job

Ralph Myers Construction Co. Hits 2.09 Miles of Rock With Good Organization to Hasten Completion of Work

(*Photos on page* 48)

✦ AFTER starting clearing and grubbing on a 410,345-cubic yard shale and rock grading contract on July 17, 1940, actual grading operations were not begun until August 9, 1940, and yet with difficult rock and long hauls, it was possible to start pouring the concrete pavement on October 15, and the job was completed within the 170 working days allowed. The job divided itself rather naturally into 1,000-foot sections, starting at the junction of U.S. 422 and State Route 66 at the south side of Kittanning, in western Pennsylvania.

Lighting for Speed

When a job is run for three 8-hour shifts a day until the 44 hours a week is used up and equipment is merely pulled out of line for greasing, it is necessary to have the job lighted as well at night as in the daytime, or as nearly so as possible. On this job four 5,000-watt gas-electric plants with 12-foot square bases on skids and 26-foot towers mounting four 1,000-watt lights each, so that no individual outfit would be overloaded, provided adequate light by centering the towers in cuts or on fills at night. The lighting outfit was assembled around a Master electric generator.

The First 3,000 Feet

Starting at the bottom of a long hill at the junction of U.S. 422 and State Route 66, a 48-inch diameter reinforced-concrete pipe 175 feet long was used to extend an existing culvert under a waste pile, widening the road considerably and forming a plaza. The first 900 feet of old concrete pavement was broken out by a subcontractor, using a Novo pavement breaker.

Within this first 3,000 feet of the job there was 132,000 yards of side-hill cut in the first 2,000 feet followed by 42,000 yards of fill made on a 2 to 1 slope, instead of the usual 1½ to 1 slope, in order to stabilize the material, as a channel change runs along the toe of the slope. Along this fill, about 10,000 yards of excavation was required for benching because of the bad character of the material in the slope. These benches carry porous backfill with 4-inch vitrified tile with open joints laid at the back of the bench. Somewhat similar drains were also laid in gravel along the shoulder at the edge of the pavement after the grade was completed.

Cuts and Long Side-Hill Fill

Between Stas. 30 and 40 was a heavy cut of 72,663 cubic yards in which all of the material was moved up an 8 per cent grade. From Sta. 45 to 72 is one long vertical curve, 2,700 feet long, giving a minimum sight distance of 710 feet. This curve goes from a +8 per cent into a —7 per cent grade.

Between Sta. 40 and 50 was another heavy cut of 62,367 cubic yards within this 8 per cent rising grade.

From Sta. 50 to Sta. 60 a 135,907-cubic yard side-hill fill was made 56 feet high on the center line and about 90 feet high measured from the toe of the slope. On this side hill was considerable bad material so that four benches 25 feet wide and 25 feet high were cut to insure the stability of the fill.

Shovel in 56,000-Yard Cut

A Lorain 87 2-yard shovel with an Amsco bucket, working against a 10-foot

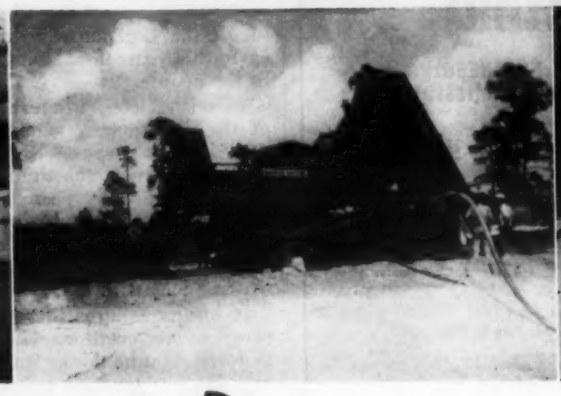
(*Concluded on page* 38)

Concreting a section of conduit arch at Franklin Falls Dam.

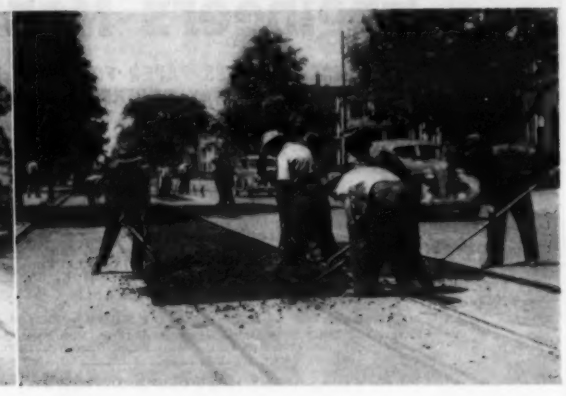
C. & E. M. Photos
A 13-yard Trac-Truk hauling disintegrated shale to the 119,000-yard fill at Sta. 70. Below, the shale as dumped for spreading and rolling.

Guy B. Dickison, Inc., Syracuse, N. Y., constructing a TEXACO Sheet Asphalt pavement on James Street, Syracuse.

W. L. Cobb Construction Company, Decatur, Ga., laying a TEXACO Sand-Asphalt surface on North Carolina State Route 53.



Edward Balf Company, Hartford, Conn., at work with a TEXACO Asphalt mix in New Britain, Conn.



A NATION-WIDE OK FROM PAVING CONTRACTORS MUST BE EARNED!

A TEXACO job of the Gallagher Asphalt Company, Thornton, Ill.

A TEXACO-surfaced road in Devil's Tower National Park, Wyoming, constructed by the Northwestern Engineering Company, Rapid City, S. D.

The Gulf Bitulithic Company, Houston, Texas, resurfacing a Houston street with TEXACO Asphalt.

Look around the country during any paving season at the street and highway projects under construction.

One fact you cannot miss is that everywhere you look—New England, the South, Middle West, Southwest and West—contractors are paving with TEXACO Asphalt.

A nation-wide O.K. from paving contractors isn't something that just drops into your lap. It has to be *earned*. And TEXACO Asphalt didn't earn it overnight, but over a third of a century. A third of a century of supplying consistently high-grade Asphalts, backed by consistently dependable service.

When you have an Asphalt problem, call on TEXACO. Request our nearest office to send a representative.

TEXACO ASPHALT

THE TEXAS COMPANY, Asphalt Sales Department, 135 East 42nd Street, New York City

Chicago Houston Jacksonville Philadelphia Richmond Boston

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Make the Public "Highway-Conscious"

An interesting and worth-while project which might well be carried out in other states was recently brought to a successful finish in Texas. This Texas Highway Week, held December 2 to 7, was sponsored by the Texas Good Roads Association, an active organization of about 25,000 civic-spirited citizens of the Lone Star State interested in the proper development of state highways, with the Texas Highway Department cooperating, in order to arouse greater interest on the part of the state's citizens in their highways and highway needs.

Active chairmen were named in almost all of the 254 counties of Texas to arrange programs, and more than 700 talks were given in all parts of the state during the week. Newspaper releases telling the story of Texas highways and the problems faced in the further construction of the highway system were used in daily and weekly newspapers and many of the talks and addresses made in all sections of the state were carried over state-wide radio hook-ups. A motion picture, filmed as a news reel and depicting in concise graphic form the uses of the state's highways, their importance in the state's business, industrial, agricultural and social life, and the highway needs, was shown in Texas theaters during the week to an estimated 4,000,000 persons. This film was prepared under the supervision of the Texas Good Roads Association. University, college and other school officials also stressed the importance of highways and motor transportation as a governmental activity to their students during Highway Week.

In proclaiming Texas Highway Week, Governor W. Lee O'Daniel urged all citizens "to take inventory of the manifold blessings brought to them by the highways of Texas, to consider the progress that has been made in the past towards a completed state highway system, and to give serious thought to future highway needs so that Texas will continue to grow and prosper as its system of highway transportation is extended and improved."

The Texas highway financial picture was stressed by speakers and by the information disseminated at meetings and organization gatherings during the week. Efforts were concentrated on bringing greater public realization to the vast amount of work yet needed on the Texas highway system to bring it up to present day needs. The importance of the state highway system in national defense was also stressed, Texas having about one-twelfth of the nation's entire strategic military highway network within its borders. It was stated that approximately $570,802,000 is required to bring the Texas highway system up to the needs of today, but the Highway Department receives only $30,000,000 a year in revenue for construction and therefore it would take 19 years to modernize the half of Texas' 26,500-mile highway system which is not yet up to modern standards.

The spot-light was turned on the state's highway financial picture particularly because of a movement for the submission of a constitutional amendment by the Texas Legislature to prevent diversion of motorists' taxes to purposes other than the building of roads and highways. The Texas Good Roads Association is sponsoring this movement to get the Legislature, which convenes early this year, to submit this proposal to the people.

In other states, where the real story of the diversion of motorists' taxes to non-highway purposes has been told to the public, such constitutional amendments have usually passed, because the main reason that such diversion is allowed at all is that the motoring public has remained completely ignorant of what is done with their money.

It has been appalling to us to discover, in conversations with the average motorist, that he thinks very little about how his gas tax and motor vehicle license fee money is spent. He assumes that it pays for the highways over which he travels. He grumbles considerably if the roads aren't as good as he thinks they should be, and he is surprised beyond words when he is informed that large sums of this money haven't been used for highways at all. Then he raves and rants, and wants to do something about it.

No greater contribution to the cause of an adequate system of good roads can be made by civic-spirited organizations and state highway public relations departments than to give to the public a true and accurate picture of the status of their highway system. The Texas Good Roads Association and the State Highway Department did an excellent job in bringing home the facts to the residents of Texas during Texas Highway Week. We say to other states, "Go and do thou likewise."

OKLAHOMA CONTRACTOR WINS 1940 NATIONAL AWARD FOR CONTRIBUTION TO ROADSIDE DEVELOPMENT

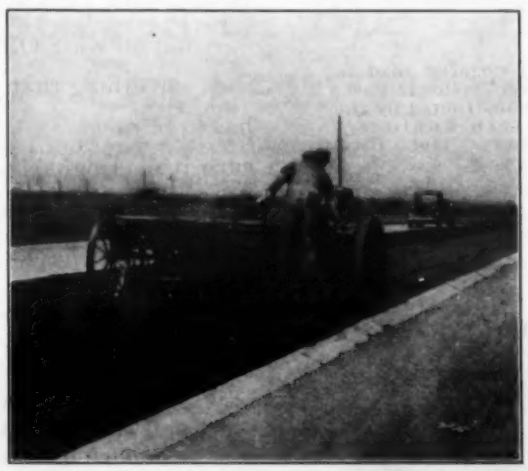
See Page 20.

"He's an ex-vaudeville hoofer, and goes haywire everytime a spotlight hits him."

Roadside Development First Annual Conference

A conference on roadside development will be held under the auspices of and at Ohio State University, Columbus, on Friday and Saturday, February 28 and March 1, 1941, to discuss the importance of roadside development.

W. A. Corbett, winner of the 1940 National Roadside Development Award.



A grain drill with a specially designed distributor was used to place fertilizer on the center parkway on Corbett's 7.157-mile roadside development project in Oklahoma, for his work on which he received both the Southern Section and National Roadside Development Awards for 1940.

Another of Corbett's ingenious devices was the use of a soil pulverizer, weighted to provide 1,000 pounds per linear foot. This compactor, pulled by an Allis-Chalmers farm tractor, was used for rolling sodded and seeded areas. The result was remarkable, with only small clods and finely divided soil particles present. In the more impervious soils, several trips were necessary.

Eroded backslopes on Corbett's contract before staking strip sodding furrows on the contour.

Close-up of the furrows on the backslopes and one of the special short-handled adzes developed by Corbett.

Finished backslopes on Corbett's job, before the growth of the sod had started.

Pavement Breaker and Sheet Pile Driver

The WB-85 pavement breaker, made by the Worthington Pump & Machinery Corp., Harrison, N. J., is suitable for heavy demolition work, ripping pavement, heavy tamping, and other services requiring an exceptionally heavy blow. According to the manufacturer, the machine delivers a hard slugging blow, yet is easy to handle and minimizes operator fatigue. The WSD-85 sheeting driver, made by this company, is furnished as a complete unit, or the driving head may be purchased separately to be used interchangeably with the breaker head on the WB-85 machine. Each tool is equipped with three sets of cheek plates so that 2, 2½ and 3-inch sheeting can be accommodated by installing the proper set of plates.

Complete information, including specifications, is given in Bulletin H-1200-B12A, copies of which may be obtained direct from the manufacturer.

Gar Wood Plants Busy On Defense Equipment

The production of equipment needed for national defense is being carried on at top speed at the various plants of Gar Wood Industries, Inc., located at Detroit, Highland Park and Marysville, Mich., and the Canadian plant at Windsor. These factories are busy manufacturing defense material and equipment such as cargo bodies, truck hoists and dump bodies of many types and capacities, winches for trucks and tractors, gun carriages, truck tank airport refuelers for the Air Corps, road machinery for airport construction and road building, wire-reeling devices for the Signal Corps, and motor boats.

Shoulder Finishing Units

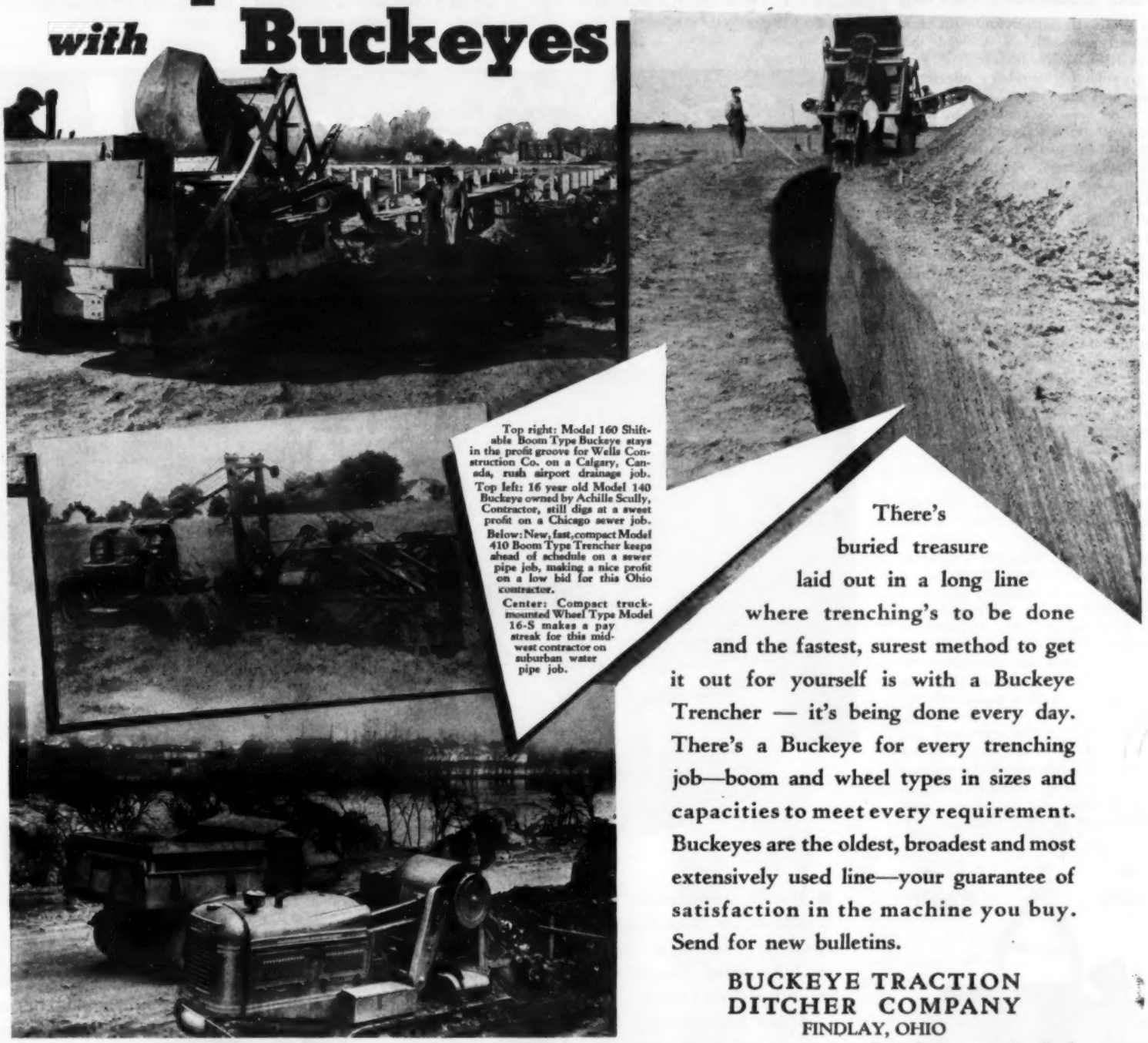
The Moritz-Bennett Corp., Effingham, Ill., has available a bulletin setting forth the construction features of its shoulder finishing machine. This unit has one standard frame and sectional boom, and accommodates various lengths of blades for finishing shoulders up to 11 feet in width. Wheels and all adjustments are equipped with Timken bearings and Alemite lubrication fittings. Also contained in this bulletin is information on the Moritz spiral scarifier which can be used in preparation of new and the maintenance of old road surfaces, subgrading for new pavements, and mixing of oiled surfaces on secondary roads.

Copies of this bulletin may be obtained direct from the manufacturer by mentioning this item.

New General Sales Manager

Haynes Stellite Co., Unit of Union Carbide & Carbon Corp., Kokomo, Ind., has announced the appointment of Robert L. Lerch as General Sales Manager. Mr. Lerch has been with the Haynes Stellite Co. since 1922 and since 1929 has been Advertising Manager and assistant to the General Sales Manager.

Stay in the Profit Groove with Buckeyes



Top right: Model 160 Shiftable Boom Type Buckeye stays in the profit groove for Wells Construction Co. on a Calgary, Canada, rush airport drainage job.

Top left: 16 year old Model 140 Buckeye owned by Achille Scully, Contractor, still digs at a sweet profit on a Chicago sewer job.

Below: New, fast, compact Model 410 Boom Type Trencher keeps ahead of schedule on a sewer pipe job, making a nice profit on a low bid for this Ohio contractor.

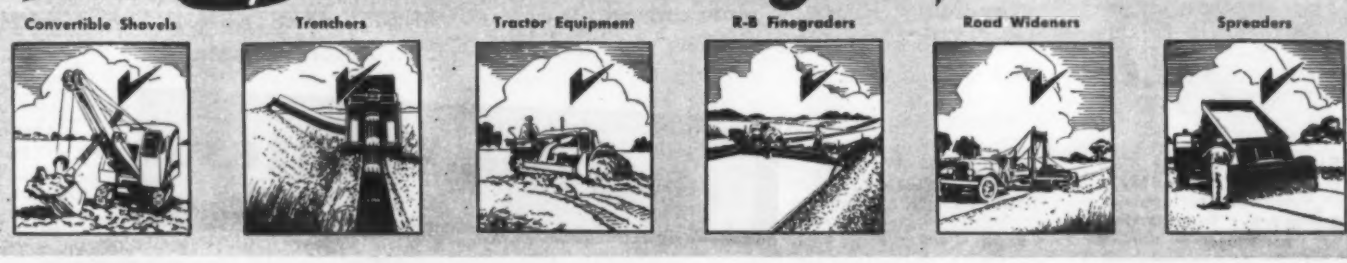
Center: Compact truck-mounted Wheel Type Model 16-S makes a pay streak for this mid-west contractor on suburban water pipe job.

There's buried treasure laid out in a long line where trenching's to be done and the fastest, surest method to get it out for yourself is with a Buckeye Trencher — it's being done every day. There's a Buckeye for every trenching job—boom and wheel types in sizes and capacities to meet every requirement. Buckeyes are the oldest, broadest and most extensively used line—your guarantee of satisfaction in the machine you buy. Send for new bulletins.

BUCKEYE TRACTION DITCHER COMPANY
FINDLAY, OHIO

See other cost-cutting Buckeye Equipment on Page 31

Built by Buckeye



A 12-foot Blaw-Knox spreader-vibrator, with one of the new B-K vibrators at the rear, in operation on a Pennsylvania highway project.

New Vibrator Tested On Concrete Paving

Tests under the observation of highway department officials showed that the new Blaw-Knox surface-type concrete pavement vibrator effectively communicates the effect of vibration over a wide area of concrete mix. In one such test on a Pennsylvania Highway Department project, it is reported, a reed tachometer registered a frequency of 4,200 at a point 8 feet behind the vibrator, while on another demonstration, vibration was observed 10 feet behind the unit.

The vibrator pan is made of abrasion-resistant steel, assembled with high-tensile alloy steel bolts and lock nuts. The vibrators consist of unbalanced rotors mounted on the pan, two being used on models for pavement widths up to 12 feet and four on the full-width machines. The center of gravity of the rotating member is readily adjustable to vary the amplitude of the vibration, and the normal frequency of 4,200 a minute is also adjustable. A feature of this vibrator is its free floating action which enables the concrete which accumulates to be fed beneath the vibrating pan and become incorporated in the slab.

Installations of this new vibrator have included applications on both concrete spreaders and finishers, including a 22-foot 6-inch paving width spreader-vibrator used on an Ohio Department of Highways project. In most instances, however, it is stated that there are definite advantages in associating vibration with the spreader rather than with the finishing machine. It costs less to install the vibrator on the spreader; and this method of operation brings about better coordination between the various functions such as spreading, vibrating, finishing, floating and brooming, each being performed in close sequence.

Further details on this new Blaw-Knox concrete pavement vibrator are contained in a new illustrated booklet which may be secured by interested contractors and engineers direct from the Blaw-Knox Co., Pittsburgh, Penna.

Gasoline Improvement Meets Special Needs

Better gasolines will result from advancements in engine design and fuel technology, William H. Hubner of the Ethyl Gasoline Corp. predicted recently in a discussion of the characteristics of today's fuels and the likely trends for the future.

Mr. Hubner pointed out that trucks and buses are large-scale users of gasoline, accounting for more than 25 per cent of the 24,000,000,000 gallons of gasoline consumed this year in automotive vehicles. The oil refiner meets the requirements of highway transportation by producing relatively few grades of gasoline on a mass production basis to meet diverse engine and operating conditions, and advancements in gasoline quality are likely to continue along well defined lines, with regular grade fuel reaching 85 to 90 road octane value within five years, Mr. Hubner said.

Gasoline refining "is fast becoming a chemical art," Mr. Hubner states, as new processes are discovered for increasing the quality and the quantity of fuels obtained from crude oil. These processes turn out base stocks which are used for blending gasolines to meet the requirements of engines.

Catalog on Dredge Buckets

Like the original riveted-lip dredge bucket, the new Amsco rivetless-lip buckets are made of tough, abrasion and impact-resistant Amsco manganese steel which insures long wearing life. Twelve other features of these buckets are set forth in a new illustrated catalog recently issued by the American Manganese Steel Div., The American Brake Shoe & Foundry Co., 956 Ferry St., Oakland, Calif.

Copies of this catalog, No. 1140, may be obtained by those interested direct from the manufacturer.

● Here's a new water-weight tandem roller (available in 5-to-8 ton and 8-to-10½ ton sizes) that sets high standards for stability, visibility, ease of handling . . . and pendulum-smooth rolling action.

Other features that make this latest addition to the A-W line a standout in tandem roller design, construction and performance are: (1) Unusually low center of gravity; (2) Rigid box frame; (3) Smooth, instant acting hydraulic steer; (4) More ground clearance beneath side plates and less side overhang combine for safe, easy rolling near curbs.

Ask us to give you complete specifications on these velvet-smooth performers. When you see how many practical improvements they provide, you'll agree that for maximum performance and economy your next tandem roller must be an Austin-Western. THE AUSTIN-WESTERN ROAD MACHINERY CO., Aurora, Illinois.

MOTOR GRADERS
LOADERS
BLADE GRADERS
ELEVATING GRADERS
HYDRAULIC SCRAPERS
CRUSHING AND SCREENING PLANTS

Austin-Western

CABLE SCRAPERS
ROLLERS
ROLL-A-PLANES
MOTOR SWEEPERS
BITUMINOUS DISTRIBUTORS
SHOVELS AND CRANES

High *in* Capacity — Light *in* Weight

BRAND NEW PUMP

New 30M MARLOW Self-Priming Centrifugal Pump; 4 cylinder, 15 hp. LeRoi air-cooled engine. Superlative performance.

MARLOW PUMPS RIDGEWOOD NEW JERSEY

Gov. Printz Boulevard Widened to Four Lanes

Rapid Increase of Traffic From Wilmington, Dela., on Relief Highway Leads to Doubling Roadway Width

✦ THE Gov. Printz Boulevard was originally constructed as a relief highway for U. S. 13 running north from Wilmington, Dela., along the Delaware River. Its capacity was soon reached and during the summer of 1940 two major contracts were completed, widening the original 22-foot highway by adding two 11-foot lanes on one side for part of the distance and one on each side for the remainder of the 4.291 miles of the contracts. The work from Edgemoor to Hollyoak, a distance of 2.557 miles, was awarded to George & Lynch, of Dover, Dela., on the low bid of $129,135.85. Work was started on May 23, 1940, and December 1, 1940, was the date of completion.

On the theory that the right-hand driving, or traffic, lane receives the greatest continuous loads the highway is designed for 11-foot traffic lanes of 9 inches uniform thickness and the passing lanes 8 inches thick and 11 feet wide.

Grade Preparation

An Osgood 1-yard power shovel was used on the rough grade loading to a fleet of five or six trucks which hauled the excavated material out to build shoulders as needed. Diagonal French drains were installed leading to the ditch along those sections of the highway where ground water was believed to be dangerous and needed to be removed from the subgrade beneath the highway. The rough grading was completed in short order by a No. 12 Caterpillar motor grader.

Last year, for the first time, the Delaware State Highway Department used a 6-inch layer of stone screenings to stabilize the subgrade. These were dumped on the grade between the forms, spread with a Warco Road Hog and rolled to firmness with a 10-ton 3-wheel Buffalo-Springfield power roller.

The form trench was prepared by five men who then assisted the boss form setter in placing and aligning the Blaw-Knox 9-inch steel road forms.

Fine Grading

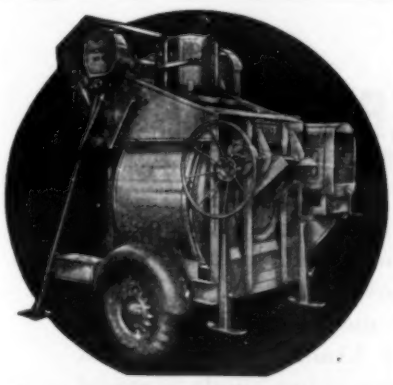
After the stabilizing layer of stone screenings had been compacted and left about 1 inch high, the fine grading operation was started, using a Heltzel subgrader pulled by a 5-ton roller. The material picked up in this operation and left against the forms was shoveled out by the five fine grade men. Along with this operation two men straightened the protruding 2 feet of the 4-foot x ½-inch round deformed tie bars set in the adjacent slab.

The second fine grading operation was a hand board pulled by two men from the same fine grade crew, but the fine grade operation was so heavy when the contractor was using two 27-E pavers that three additional men were put on this work. Following this, the same men went back and carefully cleaned the slab and top of the forms and then pulled over the final Heltzel test scratch-board. Two men from the fine grade crew also attended to straightening the forms for line and grade.

(*Continued on page 40*)

C. & E. M. Photos

The Heltzel aggregate and bulk cement batching plants on the George & Lynch contract for widening 2.557 miles of Gov. Printz Boulevard, Wilmington, Dela. This highway, formerly with a 22-foot roadway, has had two 11-foot lanes added on one side for part of the distance and one on each side for the remainder.



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- AUTOMOTIVE-TYPE TRANSMISSION, 30% to 40% more efficient, quieter, longer lived.
- HIGH CARBON MACHINED STEEL DRUM TRACKS, on chilled, ground rollers.
- 55 TO 145 ALIKE IN ALL BUT SIZE—real heavy duty service in light, fast, end discharge trailers with 2 or 4-wheel mounting interchangeable. Jaeger Criss-Cross "Re"-Mix Drum, Skip Shaker Loader, fastest "Pressure" Discharge — features that have made Jaeger the world's biggest selling line.

3½S with Measuring Batch Hopper Mixes 30% to 40% More! Send today for new catalog and prices.

THE JAEGER MACHINE CO.
701 Dublin Ave., Columbus, Ohio

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a Year Round

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SEVERELY service-tested for the past year by well-known fleet operators, a single grade of a new wheel bearing lubricant has shown astonishing lubricating efficiency . . . in sizzling summer heat and sub-zero cold.

The name of this superior new product is *TEXACO MARFAK HEAVY DUTY.*

Texaco Marfak Heavy Duty stays in wheel bearings, despite the high hub temperatures, even of electric trolley buses where engine compression is not used for braking.

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A Texaco Lubrication Engineer will gladly cooperate in making savings in your fleet. Phone the nearest of more than 2300 Texaco distributing plants in the 48 States, or write:

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FRED ALLEN in a full-hour program every Wednesday night. CBS, 9:00 E.S.T., 8:00 C.S.T., 10:00 M.S.T., 9:00 P.S.T.

METROPOLITAN OPERA every Saturday afternoon. NBC. See local newspaper for time and station.

TEXACO

TEXACO Lubricants and Fuels
FOR ALL CONTRACTORS' EQUIPMENT

Road Construction In Kentucky County

(*Continued from page* 1)

U. S. 60 and Kentucky Route 40. The old road had a base of large stone filled with gravel, making an excellent foundation for the new base and surface. To level the old subgrade a base course of 3 to 4 inches of 1¼-inch screen size and smaller limestone was first spread, rolled, waterbound and, when thoroughly compacted and dry, it was primed with 0.25-gallon per square yard of tar having a viscosity of 250.

Hauling and Spreading Stone

Stone from a quarry operated by WPA was hauled by a fleet of five county trucks, four Diamond T and one Ford, a distance of some 12 miles round trip to the center of the 5-mile project. The crushed limestone was spread down the middle of the road by raising the dump body and when the tail-gate reached a mark on the road it was tripped so that the material would be spread out in a distance of 15 paces for the large trucks and 10 paces for the small trucks. This windrowed material of stone, from 1¼ down to ¾-inch screen size, was flattened to 14 feet wide with a Caterpillar No. 33 grader with an 8-foot blade pulled by an RD4 Caterpillar tractor. Thus, a 14-foot windrow was left on the 16-foot primed road, preparatory to shooting for the road-mix operation.

Shooting the Binder

The asphalt for the project was furnished by the Kentucky Department of Highways, as part of its Rural Highway Program. A county distributor mounted on a Mack truck, with a tank capacity of 800 gallons, hauled the asphalt from Mt. Sterling, the county seat, a distance of 4 miles to the project. The Texaco asphalt was applied at a temperature ranging between 160 and 170 degrees F., and at a rate of 0.75-gallon per square yard, requiring the full 800 gallons for 650 feet of stone along the road. The pump on the distributor, which applied the asphalt under pressure, was driven by the power take-off from the motor.

Mixing and Rolling

As soon as the distributor had applied the full 650 feet of binder, the RD4 tractor and blade grader went up the windrow, moving one-half to the right side and on the trip back moving the other half to the left side of the road. This operation was repeated five times to insure a thorough mixing of the binder and the limestone aggregate. Following this, the mixed material was spread to the full 16-foot primed width of the road, leaving a crown of 3 inches.

The 650-foot lengths for spreading stone, shooting the asphalt and mixing, were set by the capacity of the distributor but the actual spreading of the material was left until three of these 650-foot sections were completely mixed so that the rolling would be most effective. The first two sections were therefore left with the material windrowed at one side of the road until the third section was mixed and ready for spreading.

The maximum delay to traffic on this local road was from 1 to 1½ hours when three sections were being spread and then rolled with the county-owned 10-ton Buffalo-Springfield steam roller. A small tank truck was kept on the job to furnish water for the boiler and also for wetting the rolls during the early part of the work of compacting the road-mix surface.

The Seal

When 1,800 feet of surface had been spread and compacted, it was sealed with 0.25-gallon of the same asphalt for the full 16-foot width and then immediately covered with ¼ to ⅜-inch limestone chips hand-cast over the surface and rolled continuously until they were thoroughly bonded in the surface voids.

A Ford pick-up truck serviced the other equipment with fuel and lubricants.

Personnel

Highway work in Montgomery County, Ky., is in charge of F. Horton Duff, County Highway Engineer, with headquarters at Mt. Sterling, Ky. On the Grassy Lick job, the county equipment was in charge of Albert Baker as Foreman, and John Willoughby was General Foreman for WPA on this work.

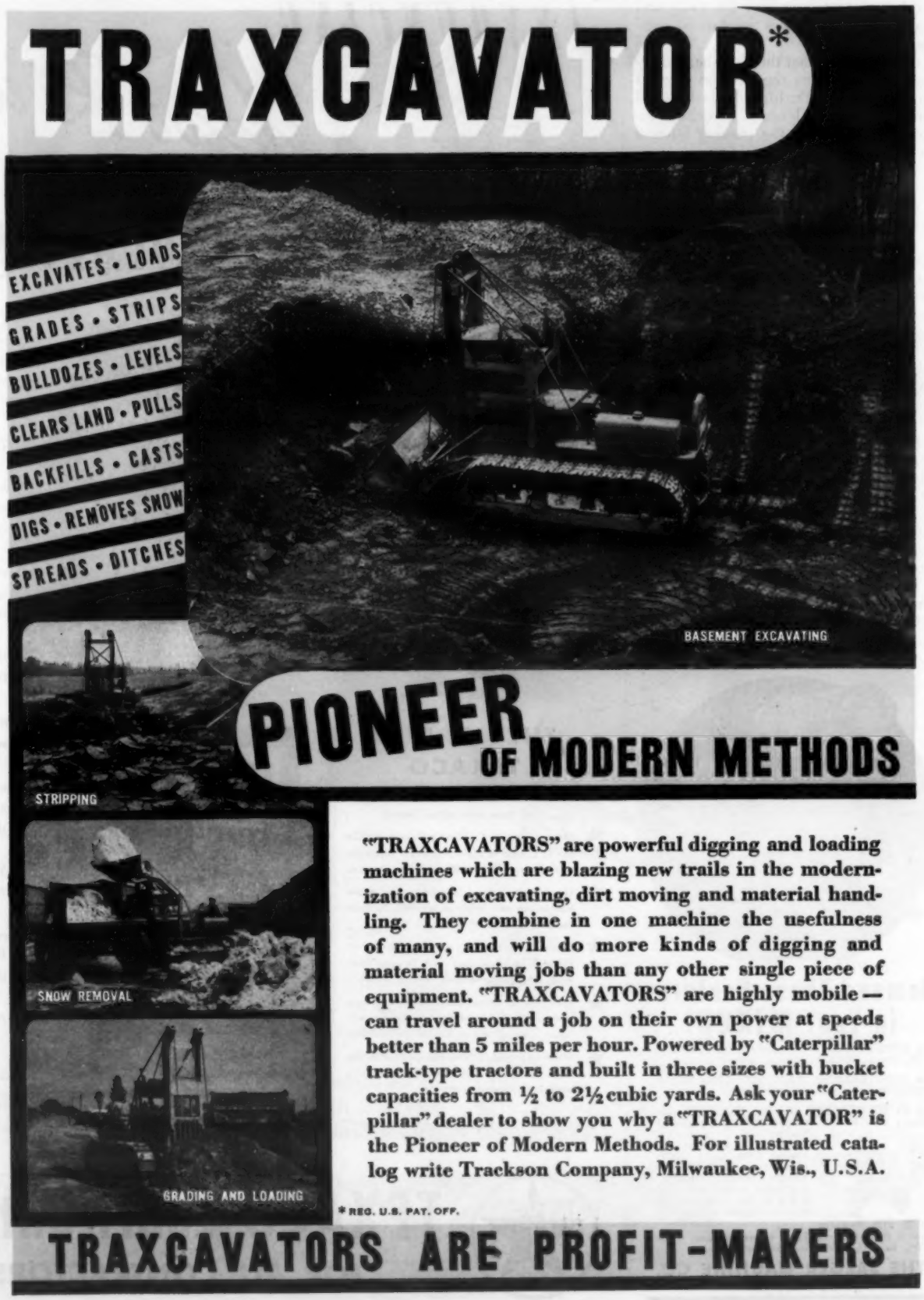
New Open-Type Shoe For Traction Treads

A new open-type shoe for use with J & S traction treads for mounting on dual pneumatic tires has been announced by the W. A. Riddell Corp., Bucyrus, Ohio. The standard or closed-type shoe which has a V-shaped cleat cast on the face of the shoe has proved successful in sand, ice, soft ground or snow. The open-type shoe is designed for the most severe conditions where the snow, ice or mud has a tendency to pack on the under side of the shoe. This type of shoe is suitable for general purposes and is said to be thoroughly self-clearing.

Either type shoe bridges the space between the dual tires and has an adjustable wedge attached to the under side of the shoe which runs in the space between the tires similar to a V-belt. This insures the traction treads remaining in place where most efficient, preserving the life of the tires as well as providing added traction.

The J & S traction tread with open-type shoe.

A circular describing both the standard and new types of J & S traction treads will be forwarded immediately by the manufacturer on request.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EXCAVATES • LOADS
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"TRAXCAVATORS" are powerful digging and loading machines which are blazing new trails in the modernization of excavating, dirt moving and material handling. They combine in one machine the usefulness of many, and will do more kinds of digging and material moving jobs than any other single piece of equipment. "TRAXCAVATORS" are highly mobile — can travel around a job on their own power at speeds better than 5 miles per hour. Powered by "Caterpillar" track-type tractors and built in three sizes with bucket capacities from ½ to 2½ cubic yards. Ask your "Caterpillar" dealer to show you why a "TRAXCAVATOR" is the Pioneer of Modern Methods. For illustrated catalog write Trackson Company, Milwaukee, Wis., U.S.A.
* REG. U.S. PAT. OFF.
TRAXCAVATORS ARE PROFIT-MAKERS

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CORRUGATED METAL CULVERTS
Easily installed—no delay and no maintenance. Guaranteed to meet U. S. and State Highway Specifications.
Durable . . Permanent Low Cost
One-half or entire surface bituminous coated as specified.
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PENN METAL CORPORATION OF PENNA.
48 Oregon Avenue, Philadelphia, Pa.

Maintaining the Efficiency Of Gas and Diesel Engines

Keeping the crankcase of a gasoline engine clean is as important as keeping ignition, timing and many other points on an engine in proper operating condition. It is just as important to clean a crankcase as it is to supply a good grade fuel for gasoline or diesel engines, to obtain maximum efficiency.

Petroleum Solvents Corp., 331 Madison Ave., New York City, has issued a 20-page bulletin "Engineering Reports on Thermal Efficiency" which discusses methods of maintaining the efficiency of an internal combustion engine by the use of carefully prepared and properly applied solvents. Copies of this bulletin may be secured by writing direct to Sid G. Harris, Manager, Sales Engineering Department, and mentioning this review.

Electric Vibrating Units

A catalog has been issued recently by the Jeffrey-Traylor Div., Jeffrey Mfg. Co., Columbus, Ohio, devoted to its line of electric vibrating equipment for feeding, weighing, conveying, cooling, screening and other processes. In addition to giving a concise explanation of the principles of design and operation, types, sizes and specifications of standard vibrators, this catalog sets forth briefly the conditions and results on a few of the many jobs to which the equipment has been successfully applied. Each example is illustrated and accompanied by specifications of the units used. According to the manufacturer, the basis of Jeffrey-Traylor vibrating equipment is balanced high frequency vibration under absolute control.

Copies of this informative catalog, No. 650, may be obtained by those interested direct from the manufacturer.

New Engineering Director Appointed for A. I. S. C.

The American Institute of Steel Construction, 101 Park Ave., New York City, has announced that F. H. Frankland, formerly Chief Engineer and Technical Director, has been appointed Director of Engineering, and will devote his entire time to technical research related to the use of structural steel and to other engineering matters with which the Institute is concerned. T. R. Higgins, who has been in charge of the Institute's New York office, is now Chief Engineer and Technical Director.

HOW TO CORRECT *the margin of error!*

THE experience-wise contractor plans for a margin of error in every survey or estimate . . . and takes steps to protect himself from going "in the red."

One of those steps, *and it's one of the most important,* is picking the right equipment. Choose it for its dependability—and for its reserve of power, ruggedness and work capacity.

That's when "Caterpillar" Diesel equipment gets an even more prominent part in the picture! Because here are tractors and motor graders you can count on for the extra punch you need when you run into hidden rock strata . . . unexpected, obstinate hardpan . . . an unusual spell of bad weather . . . or any of a number of unforeseen risks that make the going heavier and threaten the chances for a good profit!

The steady grind of night-and-day shifts is overcome by "Caterpillar" quality construction — including "Hi-Electro" hardening for track roller-rims and shafts, track-pins, cylinder-liners, crankshaft and such parts that get the most punishing wear. Difficult ground-and-weather conditions, that would bog down ordinary equipment, are met by "Caterpillar's" stubborn, load-moving traction. On top of these, you've got a *better-than-average Diesel economy* — through the ability of "Caterpillar" Diesels to operate efficiently on the low-grade, low-priced, non-premium fuels!

CATERPILLAR TRACTOR CO., PEORIA, ILL.

CATERPILLAR
REG. U.S. PAT. OFF.

DIESEL TRACK-TYPE TRACTORS • ROAD MACHINERY • ENGINES AND ELECTRIC SETS

CASCADE, IOWA. A 477,000-yard heavy-clay highway project employing four "Caterpillar" Diesel D8 Tractors and one D7 Tractor with bulldozer, pushdozer, LaPlant-Choate Carrimor, and LeTourneau Carryall scrapers. Green Construction Co., contractor.

Relentlessly at it 24 hours a day! One of the "Caterpillar" Diesel Tractor-scraper units on job mentioned above.

Tough going. Ripping up rock with a "Caterpillar" Diesel D8 Tractor and LaPlant-Choate ripper. Sand Springs, Iowa.

Fast bank dressing with a "Caterpillar" Diesel No. 12 Motor Grader on road job mentioned above. Grader uses only about 2 gallons of fuel per hour.

The Seaman Motor-Mixer used at the Bendix Airport in Indiana.

New Motor Mixer for Road Stabilization

Designed for pulverizing a highway grade and mixing with it either asphalt, tar or cement in order to provide stabilization, the new Seaman motorized Pulvi-Mixer has a number of advantages over the tractor-driven Pulvi-Mixer which has been used successfully on many stabilization projects on highways and airports during the past year.

Among the features of the new motorized unit is a 300 per cent increase in the strength of the mechanism as well as in springs and tines. The unit is operated by a 90-hp heavy-duty industrial engine and has a built-in power lift by remote control so that both the mixer and tractor to which it is hitched is handled by one operator. Knee-action wheel suspension provides a wide range of service as the ground clearance on the new machine is 28 inches for mixing large windrows and can readily be reduced to 10 inches for stabilization down to depths of 12 inches below the surface. Depth is controlled by a center cutting depth shoe which maintains a uniform level in either light or heavy soil and is not affected by soft spots.

The rotor assembly is fitted with 72 ground mixing tools made out of alloy steel, and double torsion springs are mounted on revolving cylinders of new design and driven direct from the engine power take-off. The same resilient feature of rotor suspension which has proved successful in the standard tractor-operated models is retained without change. The displacement of the hood over the rotor, however, has been increased to effect a better level and grade correction. The Motor-Mixer is balanced on two wheels, has independently sprung wheels and can be transported rapidly.

One of these units has been used in the construction of the Bendix Airport, South Bend, Indiana, where the runways, 200 feet wide and 6,000 feet long, were stabilized with asphalt emulsion, using only a 6-foot motorized mixer and a bituminous distributor. Another Seaman mixer has been used in Delaware for test stretches of road stabilized with cut-back asphalt, tar and cement.

Further information on the Seaman motorized mixer may be secured by interested contractors and state and county highway engineers direct from Seaman Motors, 305 No. 25th St., Milwaukee, Wis.

Arc Welding Lessons

"Arc Welding Manual and Operator's Training Course" is the title of a booklet published by Hobart Brothers Co., Troy, Ohio, which is used in the Hobart Welding School as well as other leading trade schools, colleges and technical institutes, as a text book covering practical lessons in arc welding.

This book sells for 50 cents and may be obtained direct from the manufacturer by mentioning this item.

New Fast Ditch Pump Handled by One Man

A new 1½-inch pump weighing only 54 pounds and capable of delivering 3,000 gph has been added to the standard line of Rex centrifugal pumps made by Chain Belt Co., 1666 W. Bruce St., Milwaukee, Wis. This Rex Junior has the patented Rex "peeler" which speeds up the prime and also has a large semi-steel recirculating water chamber equipped with an aluminum cap to save weight. It is powered by an easy starting single-cylinder, air-cooled engine of ¾ to 1 hp.

This unit is designed to pump water from excavations and to keep seepage levels low on bridge jobs, but it has been found very useful by municipal and county sewage commissions, and many other utilities, where lightness, compactness and easy portability are important. The Rex Junior is 15½ inches long, 11¾ inches wide and 15¾ inches high.

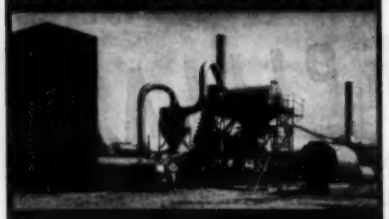
Further information including prices may be secured direct from Chain Belt Co., by mentioning this item.

Electric Tools and Vibrators

Labor-saving electric tools, such as hammers, saws, drills, disc sanders, grinders and hack saws, and their many applications are described in a catalog recently issued by the Syntron Co., Homer City, Penna., along with data on external and internal concrete vibrators and gas-electric generating sets.

Those interested may obtain copies of this Catalog No. 300 direct from the manufacturer by mentioning CONTRACTORS AND ENGINEERS MONTHLY.

YOU CAN FIND A PROFIT IN SMALL JOBS WITH THE RIGHT KIND of EQUIPMENT



And MADSEN has a small asphalt plant to meet your requirements.

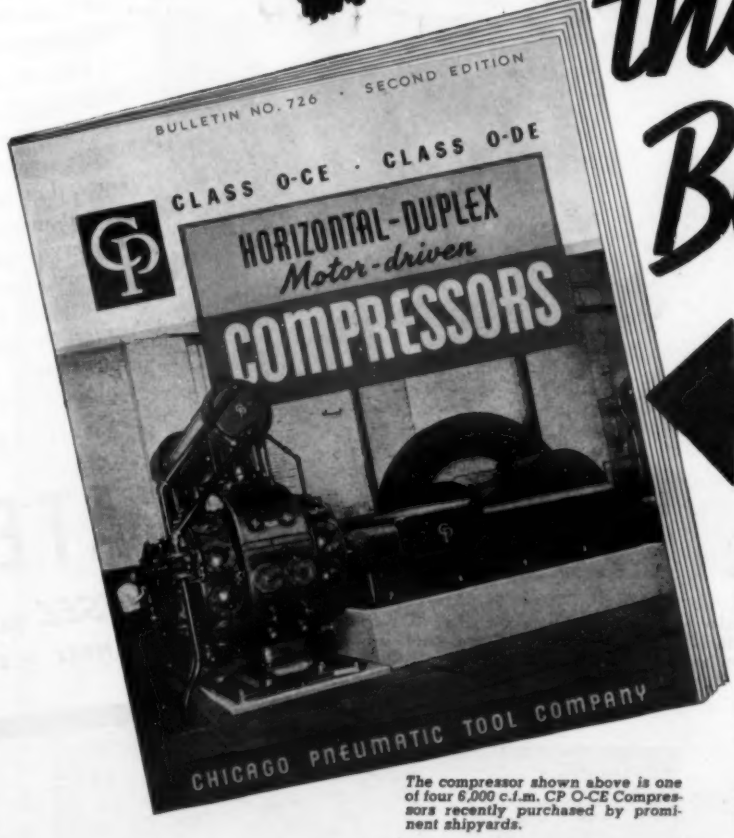
Two plants in small capacity sizes: a 500-lb. batch size, and a 1,000-lb. batch size; complete with elevator, dryer, 4-size screening, accurate weighing through multiple beam scales, asphalt injection and a twin-shaft pug mill mixer.

A complete plant unit, portable, within width, height and weight requirements for moving on any highway. Madsen engineers, pioneers in portable and stationary asphalt plant equipment, have scored another hit in this truly outstanding equipment.

MADSEN IRON WORKS

HUNTINGTON PARK, CALIFORNIA

Send for this new Booklet



The compressor shown above is one of four 6,000 c.f.m. CP O-CE Compressors recently purchased by prominent shipyards.

Bulletin No. 726 . . . just off the press . . . contains complete data on the well-known CP Horizontal-Duplex Motor-Driven Compressors. All the latest refinements . . . all the features which insure low power consumption and low maintenance cost are described and illustrated. Send for a copy.

Investigate the performance of these modern compressors. Compare it with that of your present equipment.

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 6 EAST 44th STREET, NEW YORK, N. Y.

SALES OFFICES AND SERVICE STATIONS THROUGHOUT THE WORLD

CP STATIONARY AND PORTABLE COMPRESSORS

Poor Clay and Rock On Vt. Underpass Job

Littleton Constr. Co. Ran Into Many Difficulties For 0.2-mile Project at Bethel, Vt.

(*Photos on page 48*)

✦ FOR a contract that on completion looked simple, the underpass and retaining wall built as FAGH 101-D (1) on Vermont 12 at Bethel had many complications. First, excavation for the new underpass for the Central of Vermont Railroad proved to be over an old swamp that had been corduroyed repeatedly with large willow trunks. The excavation for the footing of a retaining wall in front of a rock ledge showed the ledge to consist of some solid and some shattered rock, with much clay and boulders, and lacking in stability.

A north and south two-way road at high level was lowered to make the interchange of traffic easier, and the 528-foot retaining wall was built 2 feet higher than the old road and carries a sidewalk only. The bad conditions encountered caused a stoppage of work and redesign of the wall, somewhat delaying progress.

The Underpass

Excavation for the new underpass was started November 20, 1939. The Central of Vermont Railroad drove a temporary trestle to take care of its trains during construction. The contractor poured the concrete for the two abutments which are very attractively designed, with rounded surfaces and horizontal flutings giving an attractive architectural effect. The Railroad itself placed the steel for the contractor and the whole underpass was completed in 50 working days. It has a clear span of 32 feet 2 inches, and a clearance of 14 feet 1 inch from the new roadway surface to the under side of the span.

Before excavation was complete for the subgrade of the new roadway, sometime after the underpass itself was completed, considerable difficulty was experienced by heavily loaded trailers hauling new automobiles. Many of them had to unload the top cars and drive them through separately before they could clear the job.

Retaining-Wall Excavation

The entire job was shut down on February 10, 1940, and started up again on April 18. During the early part of the spring and well into the summer there was some rain almost every day, causing part of the trouble which was experienced with a caving bank. The old two-way road, which ran at a high level, was removed so that the retaining wall could be installed. Excavation was started at the north end of the 528-foot wall with the idea of cutting a trench for the footing and wall and pouring it from the old road grade. In the excavation the expected ledge was opened up but in addition, numerous clay pockets were struck and boulders running from 1 to 15 cubic yards in size were encountered. Over some of the clay pockets where it was expected ledge would be encountered, the Lorain 77 operated on 10 x 16-inch timbers. This shovel proved too heavy for the conditions so was taken out and a smaller one of the same make substituted.

Believing that conditions might be better at the south end of the wall, operations were shifted to that end and proved to be satisfactory for about 100 feet. Then the ledge and the same troubles with clay and boulders were met. On May 10, 1940, the job was shut down and a new design made, dropping the footing 5 to 6 feet in the middle of the wall and raising it 2 feet at each end where the character of the rock was more satisfactory. The

(*Continued on page 32*)

C. & E. M. Photo
Bethlehem steel sheet piling heavily braced was required at the center of the retaining wall, part of the new underpass project at Bethel, Vt.

FINISHING MACHINES

~

JOINT INSTALLING MACHINES

~

Flexible Road Joint Machine Co.
WARREN, OHIO

Even **ROCK** CAN'T "BUFFALO" A **LORAIN BACKDIGGER**

● Lorain Backdiggers are trench and basement specialists but whether you work them in rock or dirt makes no "material difference." Backdigger booms are available for ⅜ to 1¾-yd. units.

3/8 to 3/4 Yd.

Lorain Backdiggers are equipped with a rugged, torsion-resisting boom and either trench or basement dippers featuring manganese steel lips and teeth for maximum digging effectiveness; round back design to give faster and more complete filling, and improved spilling action.

1 to 1¾ Yd.

Lorain Backdiggers feature the controlled tilting dipper which permits dipper to be set at any digging "rake"; and to hold materials within the dipper at close-in or far-out radius until brought into position for spot dumping.

The unit illustrated is a ¾-yd. Lorain-40A Backdigger. You can see it's at home in rock, and if you'd like its record on basement work, write for Time Study Report showing how this machine can dig basements in two to three hours' time.

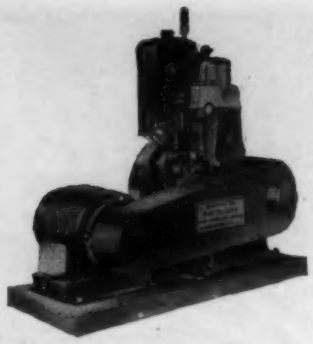
THE THEW SHOVEL COMPANY
LORAIN, OHIO

THEW CENTER DRIVE

LORAIN

DIG BASEMENT IN 2 TO 3 HOURS' TIME! THIS BOOKLET TELLS HOW IT'S DONE.

LORAIN BACKDIGGERS



A Katolight diesel-powered generating plant.

New Lighting Plants With Diesel Power

Katolight diesel-power lighting plants, made by Kato Engineering Co., Mankato, Minn., are designed to provide economical electric power for electric tools, lighting for night work, and similar uses. All Katolight alternating-current plants are powered with full diesel engines having a very sensitive governor which keeps the engine speed within a speed variation of 3 to 5 per cent from no load to full load.

The diesel engine and the generator are two entirely separate units. The engine is a low speed single-cylinder four-cycle type. The generator is mounted on an independent sliding base constructed entirely of steel. Power is transmitted from the engine through multiple V belts. This two-unit construction is claimed to have a number of advantages: there is no direct transfer of engine vibration to the generator which makes for longer generator life; and it provides a more flexible arrangement as either engine or generator can be removed and used independently.

Further information on these Katolight plants, which are made in 2, 3, 5 and 8-kw sizes, is contained in Form 1040, copies of which may be secured direct from the manufacturer by mentioning this magazine.

Bulletin on Lubrication

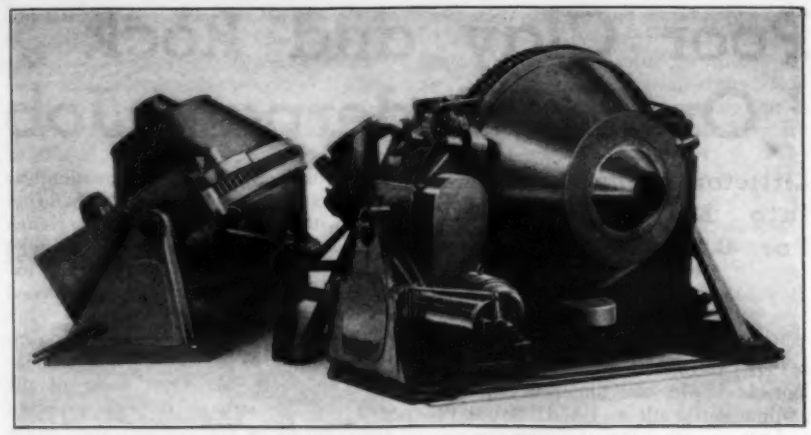
Each year the Lubriplate Division of Fiske Brothers Refining Co., Newark, N. J., issues several bulletins under the title, "Lubriplate Film," each one covering a specific lubrication problem of one particular industry. Its Lubriplate Film No. 12-40, however, breaks away from the usual format and is more general in character, covering the subjects of oils and greases. It should be of value to all manufacturers and operators of machinery concerned with the problem of arresting progressive wear of bearing surfaces, eliminating rust and corrosion and preventing contamination and damage to products.

Copies of this bulletin may be obtained direct from the manufacturer by mentioning this item.

Big Tilting Mixers

The original Smith tilting mixer was built in 1900 and, while the design remains essentially the same, the T. L. Smith Co., Milwaukee, Wis., has announced a number of refinements to these big mixers, three of which, each having a capacity of 4 cubic yards per batch, were recently purchased for the TVA Cherokee Dam Project.

The new machines can be equipped for either front-end or rear-end charging to accommodate the particular plant set-up. The feed chute automatically swings out of the way when the drum is being tilted. The drum ring gear and pinion, both with machine cut teeth, are made of high carbon steel. Other new features resulting in greater speed and improved efficiency include: all-welded steel tilting frame; machine cut reduction gears running in oil; multiple V-belt drive; anti-friction bearings throughout; and adjustable guide rollers with tapered face.



Two of the new 4-yard Smith tilting mixers recently shipped to TVA Cherokee Dam.

INFERNO

STEAM HOSE

SAVES INJURIES
SAVES CASH

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Exclusive Goodall burst-proof walls. Char resisting tube. Strong, weather resisting cover. Inferno is the hose that will last the longest.

Bears the "Standard of Quality" label (Reg. U. S. Pat. Off.) for your protection on finest quality.

Send the coupon below on a penny postal for blotters, Steam Hose Bulletin S 2-40, and prices on "Inferno."

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RUBBER COMPANY, INC.

Philadelphia, New York, Boston, Trenton, Pittsburgh, Chicago, Houston, Los Angeles, San Francisco, Seattle, Salt Lake City, and Distributors stocks at intermediate points.

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In addition to blotters and Bulletin S 2-40 please send prices on _____ ft. of Inferno, size _____ with Special "Boss" Couplings _____

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DEFENSE PROGRAM SURVEY SHOWS...

1800 strategic rural bridges need strengthening!

LOAD LIMIT BOOSTED 66⅔. Old floor on this toll bridge at North Charleroi, Pa. weighed 49 lbs. per sq. ft., had permissible capacity of 12 tons per vehicle. Refloored this year with I-BEAM-LOK Open Flooring, and reinforced with new steel sub-floor, new floor complete now, weighs only 24 lbs. per sq. ft.—less than half the old construction. Bridge now has capacity for 20-ton vehicles.

U·S·S I-BEAM-LOK OPEN FLOORING. This all-steel flooring weighs only 18.6 lbs. per sq. ft., is recommended wherever dead load must be kept to a minimum and where snow removal is a problem. It can be applied *directly* to the stringers on spacings up to 4′ and 4′6″ centers to permit H-20 loadings. It does not require secondary supports. The carrying I-Beams are a full 5 inches deep. Two supplementary bars running parallel to the tops of the I-beams produce an interlocked unit, with self-cleaning rectangular openings 1¼″ by 2¼″ which will not clog up with dirt, debris, snow or ice. By setting upper members in two planes, notched bars raised ⅛″ high, cross the direction of traffic and provide a serrated upper surface which insures firm grip and sure traction. Large size of units, 6′2″ wide up to 49′ in length, makes possible fast handling and low cost erection.

I-BEAM-LOK Flooring offers a fast, safe, economical way to help them meet required capacities

AN, as yet, incomplete survey* has revealed that of 16,000 rural bridges on the strategic highway system, 1800 have less than an H-15 capacity — the strength desired by the Army. U·S·S I-BEAM-LOK offers a practical means of bringing these bridges up to defense program requirements, with the least delay and at the least cost.

I-BEAM-LOK Flooring is strong. Long wearing. Fire safe and anti-skid. It goes down easily and has the preëminent advantage of lightness.

Note these figures. Concrete-filled I-BEAM-LOK is available in 2½″, 3″, 3½″ and 4¼″ sizes, weighs respectively only 40.2, 47, 53.5 and 55 lbs. per sq. ft. U·S·S I-BEAM-LOK *Open* Flooring is even lighter. Applied directly on stringer spacings up to 4 ft. centers for H-20 loading, it weighs only 18.6 lbs. per sq. ft.!

I-BEAM-LOK can be effectively utilized in two ways: (1) In refloooring existing bridges, where the light weight of I-BEAM-LOK often makes it possible to increase H-load rating without change in existing bridge structure — especially when I-BEAM-LOK *Open* Floor is applied. (2) In new bridges, where reduction of floor weight can be translated into material reduction in size of stringers, floor beams, trusses and piers to produce worthwhile economies, particularly on long span bridges.

Our engineers will be glad to discuss its possibilities with you.

*Engineering News Record, September 12, 1940.

USS
UNITED STATES STEEL

U·S·S I-BEAM-LOK

"New life for old bridges . . . longer life for new"

CARNEGIE-ILLINOIS STEEL CORPORATION
Pittsburgh and Chicago

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Export Company, New York

A Spreaderoller depositing chips in three layers ahead of the roller on a runway at Calgary Airport.

Runway Surfacing At Calgary, Canada

Combined Chip Spreader and Roller Was Used by the R. G. Taylor Const. Co. for Asphalt Surface Treatment

✦ THE chain of training and defense airports in Canada has been built by contract in record time. An important feature of this work is the construction of runways, because of the long period of winter maintenance necessary in that latitude. R. G. Taylor Construction Co., a prominent contracting organization which has been constructing a number of these airports for the Canadian Government, has used a combined chip spreader and roller, produced in the United States, for the surfacing operation.

A subgrade base course of 1-inch material, 3 inches thick, was first put down, sprayed with water and rolled, and then a 3-inch top base course of 1-inch material was applied in the same manner.

Surfacing Operations

After the base had dried out a tack coat of 0.3 U.S. gallon of MC-1 oil was applied to each square yard of surface and permitted to stand for 36 hours to cure. After the curing was complete, 0.3 U.S. gallon of RC-4 oil was applied uniformly over the surface by a distributor, followed immediately by the first coat of ½-inch and smaller chips laid down by a Universal Chip-Top Spreaderoller at the rate of 20 pounds per square yard. It is intended later to make a second application of 0.24 U.S. gallon of RC-4 oil and a second coat of chips spread and rolled similarly, this time using ¼-inch and smaller chips at the rate of 20 pounds per square yard.

The Spreaderoller has a portable ramp so that the chips hauled to the job in trucks could be loaded directly into the hopper of the spreader by backing the trucks up the ramp and dumping. From this hopper the material is mechanically fed to a shaker screen, the decks of which are arranged to deposit the coarser material first and the finer material on top. Immediately following the placing of the chips they are rolled by the three 30-inch rollers of the machine so arranged that a full 10-foot path is spread and rolled in one pass.

On the Calgary job the machine was operated 120 minutes, only 50 minutes of which were actually spent in spreading and rolling, and 70 minutes being spent in turning at the ends of the runway and in waiting for the material trucks to dump their loads and drive off the ramp. In the 50 minutes of actual operation 47,500 square feet, or 5,280 square yards, of runway were seal coated and made ready for use. The material used amounted to 113,800 pounds of chips, an average of 21.5 pounds deposited per square yard with the spreading and rolling machine operating at 1.08 miles per hour.

Loading a Spreaderoller with chips for use on the runways at the Calgary Airport.

New Skilsaw Vice Pres.

Leonard S. Parker, who for a number of years has been Superintendent of production for Skilsaw, Inc., Chicago, Ill., has been named Vice President in charge of operations, according to an announcement made recently.

PALMER
Friction Materials
for every kind of braking

will give you the utmost in service. You are invited to make comparative tests. *28 years' experience in producing the best in brake and friction blocks & brake linings*

PALMER
Asbestos & Rubber Corp.
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● One wire rope looks pretty much like another. But some ropes stand up better than others and make your buying money go farther. You can't *guess* what different ropes will do but you can easily keep a performance record. . . . Then you'll *know* what service your rope gives—how many hours or tons of work—how often replaced—and how much time lost for replacement. In short, you'll know exactly what you get for what you pay. . . . American Cable TRU-LAY Preformed Wire Rope shows up exceptionally well in comparative performance tests. It spools even, it handles easy, it reeves fast. Thanks to the preforming we give it. Yes, we like performance tests on TRU-LAY Preformed because they prove this rope extremely economical. . . . Write today for a supply of WIRE ROPE SERVICE RECORD FORMS. They are free. Their use will help increase production and lower costs. They are free of cost and obligation—and may be used with any type or make of wire rope. Prove to yourself that American Cable TRU-LAY Preformed is even *better* than we claim.

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AMERICAN CHAIN & CABLE COMPANY, Inc.

ESSENTIAL PRODUCTS . . . AMERICAN CABLE Wire Rope, TRU-STOP Emergency Brakes, TRU-LAY Control Cables, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Iron Castings, CAMPBELL Cutting Machines, FORD Hoists and Trolleys, HAZARD Wire Rope, Yacht Rigging, Aircraft Control Cables, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses . . . *In Business for Your Safety*

The Eagle truck-mounted loader.

One-Man Operated Portable Loader

Of interest to state, county and township engineers as well as contractors is the Eagle one-man operated truck-mounted loader for use in quarries and gravel plants, for loading sand, gravel and similar materials from hopper-bottom cars to trucks or stockpiles, or for loading dirt along the roadside.

The Eagle loader is mounted on a truck, either old or new, and is operated by means of a side power take-off from the truck transmission. The spiral feed eliminates the need of pushing the material to the bottom of the feed, and the spirals are of sufficient width to provide a wide space for trucks to back into stockpiles. The malleable-iron buckets are 16 x 6½ x 9 inches or larger. Two strands of specially constructed heat-treated chain, with provision for adjustment, carry the buckets. The elevator frame is fabricated from channels, electrically welded into rigid one-piece construction. The top side of the elevator is equipped with flare boards, and the bottom is enclosed to protect the operator and the truck from spillage by overloaded buckets. The hopper at the discharge end of the elevator is fitted with an adjustable swivel chute for delivering material into trucks. The proper speed of elevator is obtained by reducing the speed from the power take-off through a special gear reducing box which has steel cut gears and operates in oil.

When moving from job to job, no dismantling or knocking down is necessary. The elevator is simply tilted to horizontal position, and the unit is ready to proceed to a new location at truck speed. When moving short distances, as from one stockpile to another or from one location in a quarry to another, it is necessary only to raise the feed end which takes but a few moments.

Further details on the Eagle loader are contained in an illustrated bulletin, Form 1139, copies of which may be secured direct from the Eagle Crusher Co., Inc., Galion, Ohio, by mentioning this magazine.

Two New Bulletins On Hauling Scrapers

Two new catalogs have recently been issued by the Slusser-McLean Scraper Co., Sidney, Ohio, one devoted to its Hauling-All scraper and the other to its Mammoth hauling scraper. The former is available in 3, 5½, 9 and 13-yard sizes, has a two-piece, all-welded frame of box-type construction and double cable control. Bowls are constructed of heavy steel plate. The same principles of construction are embodied in the Mammoth scraper which is available in sizes ranging from 3 to 15 yards.

All pertinent data on these machines is contained in the illustrated catalog describing it. Copies of both or either may be obtained direct from the manufacturer by mentioning this item.

New End-Discharge Mixer

The latest developments now available with the Koehring 14-S Dandie mixer should be of interest to contractors and state and county highway engineers. According to the manufacturer, the Koehring Co., 3026 W. Concordia Ave., Milwaukee, Wis., this mixer can now be adapted to all types of jobs within the limits of its production capacity. For standard jobs, there is the 4-wheel side-charging mixer; for the contractor having scattered jobs or for state and county work, the Trail-Mix is recommended because it can be moved at high speed and quickly spotted on the job to pour directly to forms, chute or concrete carts; and now, for the small paving jobs, there is the 4-wheel end-discharge 14-S Dandie.

This new model is fully illustrated and described in Bulletin K-166 recently issued by this company, with complete specifications and dimension drawings included. Copies may be obtained by writing direct to the manufacturer.

Bigger *Digging* Profits
Guaranteed with this
KIESLER CLAM SHELL BUCKET

This bucket, when properly reeved and operated, is guaranteed to do a bigger day's work than any other bucket of equal size and weight.

Write for Catalog

JOS. F. KIESLER COMPANY
936 W. HURON ST., CHICAGO, ILL.

ONAN Electric Plants
Dependable—Reliable
Alternating or Direct Current

New Models
for
Portable—Stationary
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Over 40 STOCK MODELS—350 to 50,000 Watts

ONAN PORTABLE ELECTRIC PLANTS are used and endorsed by Private, City, County, State and Federal Engineers and Contractors. Operate anything electrical used in Construction and Maintenance—MOTORS, WATER PUMPS, DRILLS, SAWS, SANDERS, SURFACERS, TAMPERS, GRINDERS.

From the small 350 Watt HAND PORTABLE MODEL to the 5000 Watt TRAILER TYPE, they're all STURDY, DEPENDABLE and "able to take it" on even the toughest jobs.

Completely Water-proofed and Ignition Shielded, they'll operate continuously in any weather.

THOUSANDS IN OPERATION IN ALL PARTS OF THE WORLD for hundreds of different uses. There's a Model for your Jobs too.

Stationary Models to 50,000 watts.

We've manufactured Electric Plants exclusively for over 15 years.

Write NOW—Let us know your needs—
We'll send complete details.

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1223 ROYALSTON AVE.—MINNEAPOLIS, MINN.

SURE THERE'S *a* DIFFERENCE

The man who buys Littleford Road Equipment knows the difference! The man who operates the Equipment knows the difference! "What is this difference?" "Well! It's simple to define."

Littleford Road Equipment is *Engineered* and *Designed* to meet present day Black Top requirements. Each unit is *efficient* and *economical, gadgetless* in construction and, above all, speedy in operation.

Compare the Littleford Pressure Distributor with ordinary distributors; it has less working parts, less gadgets, and the most simplicity of any unit yet designed.

Compare the Littleford "Tankar" Heater; it's small, compact, and produces 200 lbs. steam pressure in 2 minutes' time. It heats a tank car in one-third less time than ordinary tank car heaters.

Other Littleford units invite comparison, too! The Littleford 84-HD Kettle, Road Broom, Wheeled Roller, and the No. 101 Utility Spray Tank all have the same painstaking Engineering and Designing.

Purchase units having the Littleford Trade Mark; you, too, will say, "Sure! There's a Difference!"

No. 1 Littleford "Tankar" Heater
No. 2 Model No. 101 Utility Spray Tank
No. 3 No. 84-HD Tar & Asphalt Kettle
No. 4 Portable Wheeled Roller
No. 5 "Spray Master" Distributor

BLACK TOP ROAD MAINTENANCE EQUIPMENT LB SINCE - 1900
LITTLEFORD
LITTLEFORD BROS.
485 E. Pearl St. Cincinnati, Ohio

Susquehanna River Bridge Part of Maryland Relocation

Construction of 7,613-Foot Structure Completed; Another Link in Highway Improvement Project

By EDWARD H. NUNN, Construction Engineer, Maryland State Roads Commission

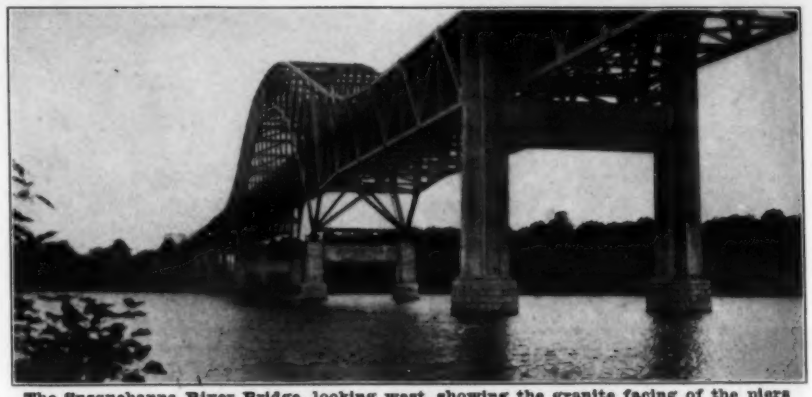
(*Photo on page* 1)

✦ THE construction of the bridge over the Susquehanna River was the control for the completion of an entirely new relocation project on U.S. Route 40 from Baltimore, Md., to the Delaware state line (C. & E. M., Jan., 1941, page 24). It was estimated that if work were started in December, 1939, the bridge could be opened to traffic in June, 1940. The actual date of opening was August 28, 1940.

In the channel span of both channels there is a vertical clearance of 89 feet above mean low water and a horizontal clearance of 410 feet. This provides ample navigation clearance, eliminates the necessity of a costly movable span, and gives sufficient vertical clearance to effect a grade separation of the west approach. The elevation of the west approach was fixed by the necessity of a grade separation at the Aldino Road from Havre de Grace to Bel Air. The approaches are above the highest recorded flood in the Susquehanna River.

A 46-foot roadway width between curbs has been provided to accommodate four lanes of traffic and, in addition to the roadway, two emergency footways each 2 feet 6 inches wide have been built. The maximum grade on the roadway is 3 per cent rising from the west approach to a point over the west channel. A vertical curve 670 feet long connects this approach grade with the level grade over the remaining length of the bridge, which provides a minimum sight distance of 1,000 feet. The bridge is a tangent except for a section of the west approach built on a 2-degree curve.

The west approach to the bridge begins at the intersection of relocated Route 40 and the Chapel Road in Havre de Grace. The east approach begins at the Perryville-Aiken Road, and the toll plaza is located between the Perryville-Aiken Road and the east abutment. At the bridge site the Susquehanna River is divided into two channels by Garrett Island. The bridge has a west channel crossing of 2,169 feet, an east channel crossing of 1,646 feet, a Garrett Island crossing of 1,509 feet 9 inches, a west approach section 1,039 feet 3 inches, and an east approach section 1,249 feet, making a total overall length of 7,613 feet from abutment to abutment. The highway approach on the west is 1,175 feet and the east approach 1,573 feet 8 inches or a total length of bridge and approaches of 10,361 feet 8 inches. Both channel crossings consist of a 3-span continuous unit, the center span of which is a through truss and two side spans which are part through trusses. The remaining sections of the bridge are deck trusses or deck girders of the simple or continuous type.



The Susquehanna River Bridge, looking west, showing the granite facing of the piers to protect them against severe ice conditions.

The design of the bridge is for a standard H-20 load in accordance with the Standard A.A.S.H.O. specifications for highway bridges dated 1935. There were slight modifications necessary because these specifications cover span lengths up to 300 feet only. This loading provides for a truck of 20 tons, gross maximum load, placed anywhere on the roadway and in such number as to produce the maximum stress which might occur at any member of the bridge or portion of the structure.

Toll Collection

The toll plaza will accommodate peak traffic of 3,000 vehicles an hour based on 2,000 vehicles operating in one direction and 1,000 operating in the other. The plaza provides six traffic lanes passing under the toll booth canopy and two traffic lanes passing in the clear, with three toll islands, each

(*Continued on page* 44)

Carey Elastite EXPANSION JOINT
Standard in Concrete Construction for 25 Years
ECONOMICAL and EFFICIENT
Asphalt Joint · Rubber Joint
Non-Extruding Expansion Joint
Plate-Dowel Expansion Joint
Sub-grade Felt
THE PHILIP CAREY COMPANY
Dependable Products Since 1873
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It's New! It's Free!
PORTABLE CRUSHING PLANT GUIDE

● If you want to know "what's the latest" in portable crushing plants . . . if you want practical ideas on how to get bigger output and finer sizing from a portable and which type plant will give it to you, whether you're crushing quarry rock, or preparing bank gravel — *ask for free Guide P-34.*

Telsmith General Utility Portable Outfit, equipped with Telsmith-Wheeling Jaw Crusher and bucket elevator. Includes worm-wheel device for raising elevator.

General Utility Crushing Plant
Ideal for the contractor or state or county highway department wanting a mounted crusher with a bucket elevator to deliver crushed product to bin or screen over bin. Furnished with either jaw or gyratory crusher, and with or without power unit. A low first cost, low upkeep outfit, but exceptionally well built.

TELSMITH Standard Portable Crushing, Screening and Loading Plants—

A single crusher in closed circuit with a bucket elevator and vibrating screen. The crusher may be a jaw or gyratory (for coarse or medium sizing), or a secondary crusher for fine reduction. The jaw crusher furnished is a high-speed Telsmith-Wheeling with *cylindrical roller bearings.* It turns out a uniform cubical product unusually free from slabs or dust. Recommended for production of 1"–1½" rock. In all cases, crusher is in closed circuit with the screen. No oversize can get into product.

TELSMITH Coarse Crushing Portables—Mounted jaw or gyratory crusher, not in closed circuit. A rugged, big capacity outfit for quantity production on big road jobs.

TELSMITH Tandem Crushing Plants—A super-crushing portable for quarry use. A tandem combination—coarse crushing unit . . . followed by large capacity, fine crushing, screening-loading plant operating in closed circuit.

TELSMITH Dual Crushing and Screening Portable—Exceedingly mobile. Combines jaw breaker and roll crusher with more ample screening and conveying capacity.

● *For complete details, get the new free 20-page Guide P-34.* P-1-C

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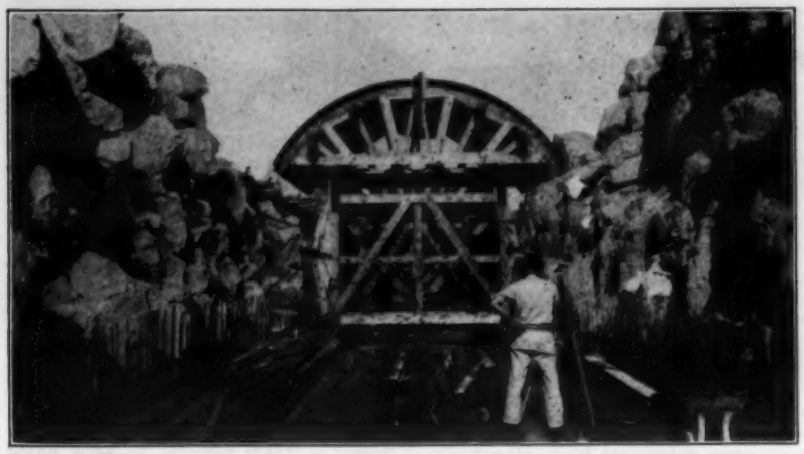


C. & E. M. Photo

A jumbo setting a section of conduit arch at Franklin Falls Dam, N. H.

Concreting Methods At Franklin Falls Dam

(*Continued from page 2*)

which is absolutely necessary for the handling of the concrete by the Pumpcrete unit. Sieve analyses on the sand are made every hour and on the stone every four hours, while a moisture test is made from the batch every 15 minutes, which is equivalent to a test every 10 to 15 cubic yards of material.

Class A concrete was used in conduit transition walls where more strength is required, and Class B concrete in standard conduit sections. Class B concrete is varied in weight because of the different gradations in the two sizes of coarse aggregate.

Class A concrete averaged 4,000 pounds per square inch in 7 days and Class B concrete, 3,000 pounds per square inch in 7 days.

Since the use of the river water for concrete was not permitted, the subcontractor drove a 10-inch well approximately 83 feet deep in good gravel and secured an adequate supply for the concrete mixing water.

Concreting was started on September 4. Concreting for the outlet works was completed in December, 1940, and for the spillway will be completed in 1941.

A fleet of nine 2-yard truck mixers is used to haul and mix the batches in the trip from the batching plant on the east bank to the two Pumpcrete units on the west bank where all of the concrete is being placed. This fleet includes seven Smithmobiles and two Smith truck mixers.

The truck mixers deliver their loads of mixed concrete to the hoppers of the two No. 200 Pumpcrete units by backing on to a ramp and dumping through ports in the decks. The ramp is inclined downward 24 inches in its 18-foot length to help the truck mixers discharge their loads completely in 1½ minutes.

The upper of the two construction bridges crossing the Pemigewasset River on the job was built by the general contractor for the use of the concrete subcontractor. It is 450 feet long with four vertical and two battered piles per bent and with long heavy piles for curbs and guard rails. The bridge is only one lane wide and was used as a temporary access road before concreting, and then was intended solely for concrete hauling. During the last four months of 1940 the bridge was used by the general contractor's dirt-moving equipment as the moisture leaking out of the impervious fill at the core had so softened the dike road along the river bank that loaded trucks could not travel it safely. For this reason the trucks were routed east on the lower bridge and west on the concrete hauling bridge.

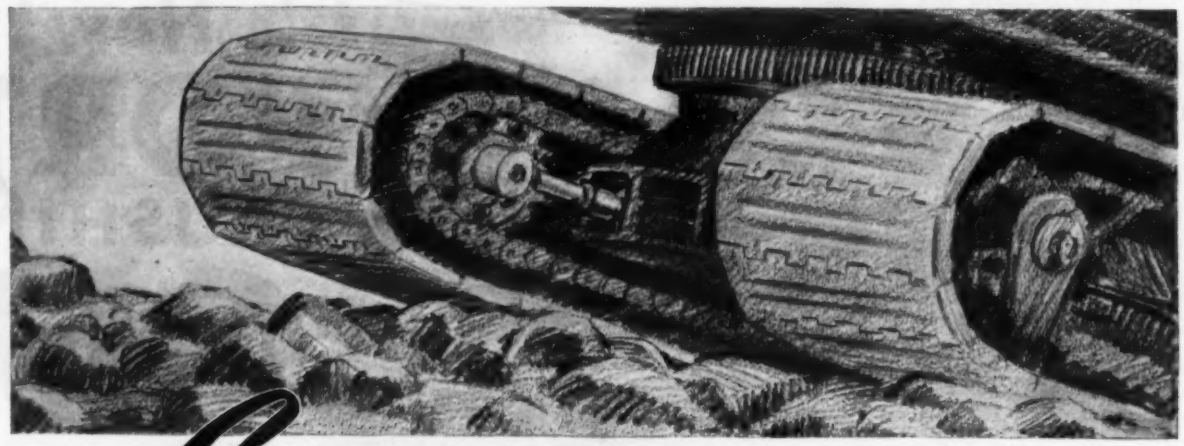
DRY WEIGHTS FOR 2-YARD BATCHES OF CONCRETE AT FRANKLIN FALLS DAM

	Class A	Class B_1	Class B_2	Class B_3
Fine sand	274 lbs.	245 lbs.	245 lbs.	255 lbs.
Coarse sand	2,403 "	2,145 "	2,145 "	1,963 "
1/4"—1" stone	3,992 "	2,310 "	2,090 "	2,144 "
1"—2" stone	1,173 "	2,310 "	2,540 "	2,650 "
Water/Sack	5.5 gals.	6.0 gals.	6.0 gals.	6.0 gals.
Cement	1,173 lbs.	940 lbs.	940 lbs.	940 lbs.

Rock Surfaces Grouted

All rock surfaces are lightly covered with grout before the concrete is placed. For this purpose the contractor uses a grout machine made of an old compressor tank of slightly more than 1-yard capacity with a 3-inch curved-pipe outlet with a valve. The tank is set vertical on skids with a manhole at the top through which the grout is poured into the tank and with a tap for the air connection also at the top. After air at 100 pounds pressure has been applied at the top, the 3-inch valve is opened and the grout delivered through a separate pipe line to the form to be poured. A novel feature of this grouting machine is the insertion of a ¾-inch air line in the 3-inch discharge pipe so that if the grout stiffens up and does not flow readily under the air pressure at the top of the tank, slugs of air can be admitted under

(*Concluded on next page*)



Coming back fast—

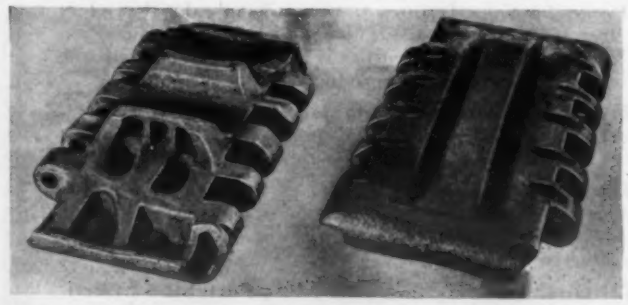
MANGANESE STEEL TRACTOR SHOES

ALWAYS admitted as the "toughest steel known" and the best material for tractor shoes—manganese steel is again getting the call, due to the economical production methods of our manganese steel foundry.

Tractor tread shoes have a hard life. They must withstand almost constant grinding and buffeting on rocky ground. The entire weight of a shovel may balance on the surface of one shoe and it takes "tough stuff" to stand this abuse.

Several large manufacturers of shovels are now leading the way back to manganese steel by standardizing on this ideal material for tractor shoes. Three reasons are outstanding:

1. Manganese Steel cost is now lower.
2. Substitutes for manganese steel have been found unsatisfactory.
3. Manganese steel is now produced in a finer grade for this particular use.



● Photo of wear-resistant, long life, manganese steel tractor tread shoes. With manganese steel shoes and dipper fronts, the shovel is effectively insulated against the roughest and rockiest of operating conditions.

● Manganese steel is not only tough to begin with, it actually gets tougher and harder under heavy impact. This peculiar quality is characteristic of this metal and is well known among metallurgists.

We operate the largest and most complete manganese Steel foundry in the United States

PETTIBONE MULLIKEN CORPORATION
Established 1880
4710 West Division Street, Chicago, Illinois

PILE HAMMERS and EXTRACTORS
HOISTS—DERRICKS WHIRLERS
●
Special Equipment
Movable Bridge Machinery
●
Write for descriptive catalogs.
McKIERNAN-TERRY CORP.
19 Park Row, New York
Distributors in Principal Cities

Concrete for Dam Pumped into Place

(*Continued from preceding page*)

the same pressure to break the grout and expedite its movement through the grouting pipe. By mounting this machine on skids with cable loops it is possible to place it in the most convenient position for grouting with the shortest grout lines.

Concrete Pumped To Place

To place the 76,000 cubic yards of concrete in the intake structure, conduit transition sections, bridge piers, conduits, outlet approach channel walls, spillway walls, wire and stilling basin, Great Lakes is using two No. 200 Pumpcrete units, delivering a maximum distance of 800 feet from the machines and with a maximum rise of 32 feet. The 8-inch inside diameter delivery pipe is carried on a trestle of two 4 x 6-inch posts with 6 x 6-inch caps, decked with 2 x 8-inch planks, with 2-inch spaces between, and braced with 2 x 8-inch planks. The stringers are all 4 x 6's. Two men comprise the pipe-line crew.

In order to secure the best operating conditions with the crushed-gravel aggregate in the double-acting Pumpcrete units, the slump is being maintained between 2 and 2½ inches throughout the work. Under full operating conditions, the machines place 30 cubic yards of concrete per hour each, and at times as much as 40 cubic yards per hour for 2 or 3 hours.

Conduit Forms

The conduit invert was poured in alternate 33-foot sections and then old 30-pound rails were set with a 12-foot gage to carry the jumbo for supporting the arch section of the conduit. The jumbo was 12 feet wide and 16½ feet long, built up mostly of 6 x 8 timber with four crane rail wheels for traveling. The inside conduit forms consisted of two wall sections 8 feet high, one for each side, and an 11-foot radius arch form in three sections bolted together. The studs for the wall section were 2 x 8's while the segments for the arch were 2 x 12-inch western fir and the wall sections were covered with 2 x 6-inch tongue-and-groove sheeting of southern shortleaf yellow pine, and the same material in 2 x 4-inch lumber was used on the arch. The segments for the arch section were held by eight radial braces from the spreader which was carried on the jumbo with wooden wedges used to secure exact alignment and grade. The entire top of the inner arch form was covered with 0.6-gage sheet metal welded at the seams.

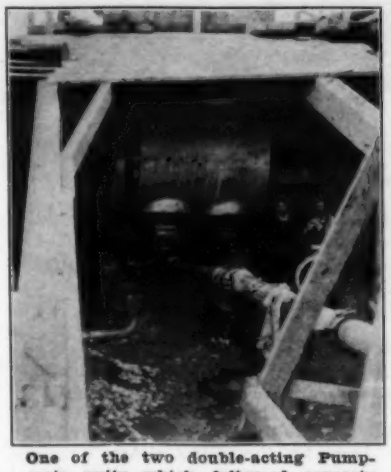
The invert and the wall are tied with 1-inch round deformed bars, the outer set being angle bars and the inner straight bars spaced 1 foot 6 inches longitudinally and 4 inches in from the faces of the walls. All concrete was vibrated in the forms with Chicago Pneumatic vibrators.

Lighting

In addition to the huge banks of floodlights set up on the ledge above the work, Great Lakes installed a series of dishpan reflectors along the Pumpcrete pipe-line trestle to illuminate the conduit sections on either side. These reflectors are really ordinary dishpans painted with a white reflector paint on the inside and contain three 100-watt bulbs each. The novel feature of the reflectors is the swivel mounting consisting of a U-frame made with a 2 x 2 horizontal piece with two 1 x 2 uprights. At the top of the uprights two hook nuts engage the handles of the dishpan and can be tightened or loosened to angle the reflector up or down. In the bottom 2 x 2 a bolt holds it to the trestle stringer and this permits angling the reflector horizontally.

Personnel

The Franklin Falls flood-control dam at Franklin, N. H., is being built by the U. S. Engineer Department under the direction of the Boston District Office, Lt.-Col. Leonard B. Gallagher, District Engineer, with H. C. Byrnes, as Resident Engineer, and W. P. Eaton, J. W. Bishop and E. H. Rice, Assistant Resident Engineers on the three shifts. N. H. Siglow is in charge of layout for the U.S.E.D., F. A. Carboine is Office Engineer, and F. F. Mayer is Concrete Technician. L. H. Huntley is General Superintendent, M. Mason, Superintendent, and Rex Starrett is Job Engineer for Great Lakes Dredge & Dock Co., of Chicago, Ill., on concreting operations.



One of the two double-acting Pumpcrete units which delivered concrete through 8-inch pipe to the forms at Franklin Falls Dam in New Hampshire.

Catalog on Graders

The No. 501 and the No. 511 motor graders, made by J. D. Adams Co., Indianapolis, Ind., are described in detail in a new catalog, Form 4024, recently issued by this company. These machines are identical except for engines, the No. 501 being equipped with a 66½-hp gasoline engine and the No. 511 with a 68½-hp diesel engine. Standard equipment includes a 12-foot blade, leaning front wheels with rib-tread tires, tandem drive with four ground-grip low-pressure tires, hydraulic wheel brakes and mechanical transmission brake.

This catalog is profusely illustrated, and complete data such as construction features, range of applications and specifications, are given. Copies may be obtained direct from the manufacturer by mentioning this item.

COMPLETE
WELL POINT SYSTEMS
WILL DRY UP ANY EXCAVATION
Faster—More Economically
Write for Job Estimate and Literature
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MACHINERY & EQUIPMENT CO., Inc.
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36-40 11th St., Long Island City, N.Y.
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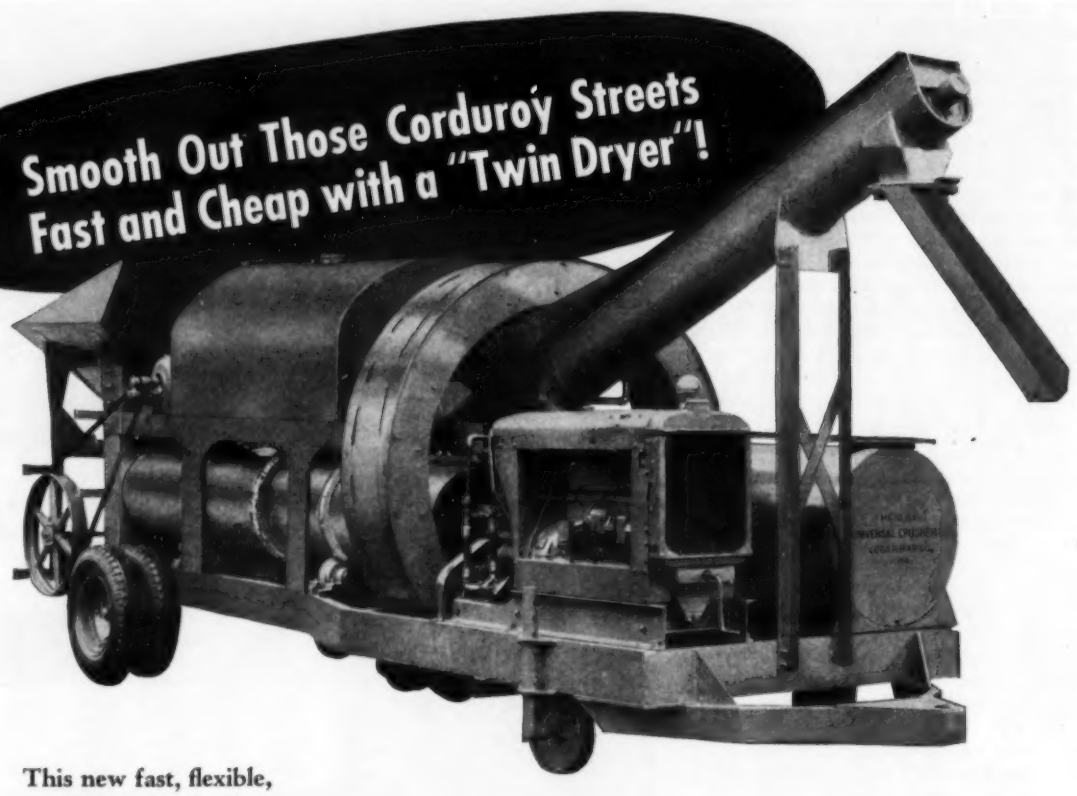
Smooth Out Those Corduroy Streets Fast and Cheap with a "Twin Dryer"!



This new fast, flexible, portable asphalt plant is a "life saver" for city street departments.

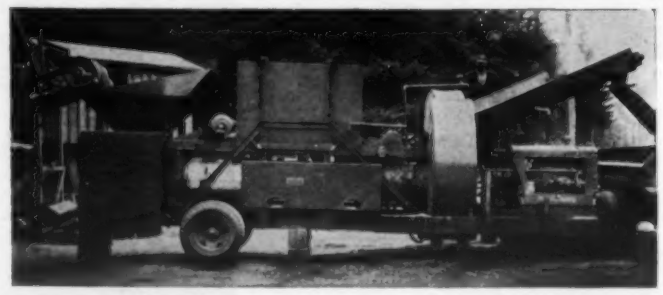
It makes asphalt mixtures for surfacing residential streets, concrete road approaches, parking lots, airports and for quickly widening other pavements.

It's the most practical machine ever built for producing low cost maintenance and hot patching materials. Quickly moved from place to place. Fed by gravel plant conveyor, dragline or bin.

You keep the goodwill of citizens and make street repair dollars go twice as far with a Universal "Twin Dryer" Portable Asphalt Plant. Get the cost-cutting facts—write today!

How the Universal "Twin Dryer" Asphalt Plant works:

Sand and aggregates from a gravel plant conveyor, trucks or bins are fed into a twin hopper with manually controlled regulator which discharges into oil-fired twin dryers—sand to one dryer and aggregates to the other. Dried material is elevated by Rotavator to a Screw Pug Mill where hot oil is added. Oil tank is heated by waste heat from dryers. The asphalt mix is thoroughly cut and kneaded on its way to the swivel discharge chute. Material loads into trucks. Operation is fast, simple, thorough. Capacity up to 42 tons of finished material per hour. Construction is rugged. Easily moved over streets and roads from pit to pit or barn.



UNIVERSAL CRUSHER COMPANY, 620 C Ave. West, Cedar Rapids, Iowa

UNIVERSAL
CRUSHERS, PULVERIZERS, COMPLETE PLANTS, SPREADEROLLERS, PORTABLE ASPHALT PLANTS

Highway 21 in Nacogdoches County, Texas, after army maneuvers last summer.

Light Army Trucks Damage Texas Roads

Extensive maneuvers of troops of the United States Army with motorized divisions were held in the Sabine Forest area in East Texas in the spring of 1940. Approximately 70,000 men took part in these maneuvers, and with the exception of heavy commercial transports used to haul supplies, the motorized equipment was very light. In spite of this the equipment did considerable damage to the older and obsolete roads.

In estimating the damage suffered by the highway system during the period of the Army maneuvers, the Texas Highway Department considered each individual road separately. The damage to the various roads ranged all the way from the loss of a little gravel surface to a very badly damaged base. Engineers' estimates of the cost of repairing the roads ran from $50 a mile to $700 a mile and grossed about $200,000. These figures cover the cost of digging out the base failures and patching with additional gravel and sealing the patches with cut-back and sweepings.

Texas Highway 21, from Nacogdoches east to the Attoyac River, offers an excellent example of the damage done by these motorized maneuvers to the lighter roads. This section is approximately 20 miles in length. The grading and drainage structures were built and a light iron ore gravel surface, 16 feet wide, constructed in 1920. In 1936, an additional 25 cubic yards of iron ore gravel per station was added, and it was then sealed with cut-back asphalt at the rate of 0.9 gallon per square yard, using sweepings as cover material. Since that date the road has been maintained in the same condition up to the time of the maneuvers.

Due to the extraordinary maintenance required to place this road in a suitable travel condition, following the maneuvers, it was decided to scarify and maintain this section as a gravel surface road until such time as funds are available for reconstruction. The maneuvers proved very definitely that the better type of highways in Texas are adequate to take care of the army traffic with its present equipment. It also proved very conclusively that the lighter type and obsolete roads will not stand up under even the comparatively light motorized units to which some of them were subjected during these maneuvers.

Two-Valve Feature Of New Rock Drill

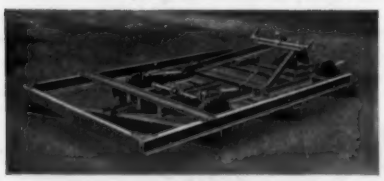
Two new features of the Class L-57 Sullivan rock drill are its dual valve and its cushion control. By means of this dual valve, air is controlled independently at each end of the piston; that is, the correct volume of air to give maximum striking power is admitted behind the piston, the valve is closed and the piston is propelled by expansion of the air. After the blow is delivered, air is admitted ahead of the piston to give a return stroke with strong rotating power. Premature admission of live air ahead of the piston, which reduces the force of the blow, is avoided.

The cushion control on the L-57 is designed to provide increased air efficiency, high drilling speed, low air consumption, and ease of handling. This 57-pound 24-inch machine drills to a depth of 14 to 16 feet, is equipped with a shake-proof five-position throttle handle, rubber cushioned steel puller, and a 4-hour capacity oil reservoir, and provides full line-pressure hole blowing. It is available in dry, blower and wet types which are easily interchangeable and with various chuck sizes and rotation speeds.

The L-57 can be supplied with cradle and shell mountings, with rigid or sliding trunnion for 24 or 30-inch steel changes, or can be mounted on Featherweight automatic or motor feed wagon mountings for 4 or 6-foot steel changes.

Copies of Bulletin 87-H describing the Sullivan L-57 rock drill may be secured by those interested direct from the Sullivan Machinery Co., Michigan City, Ind., or Claremont, N. H.

BURCH



DRAWN TYPE ROAD MAINTAINER will do a perfect job using for power the tractor or heavy truck you now own. It will plane off the high places and fill in the low, leaving a smooth even surface. A seven blade machine, the rear blade being reversible will move the material to the right or left as desired.

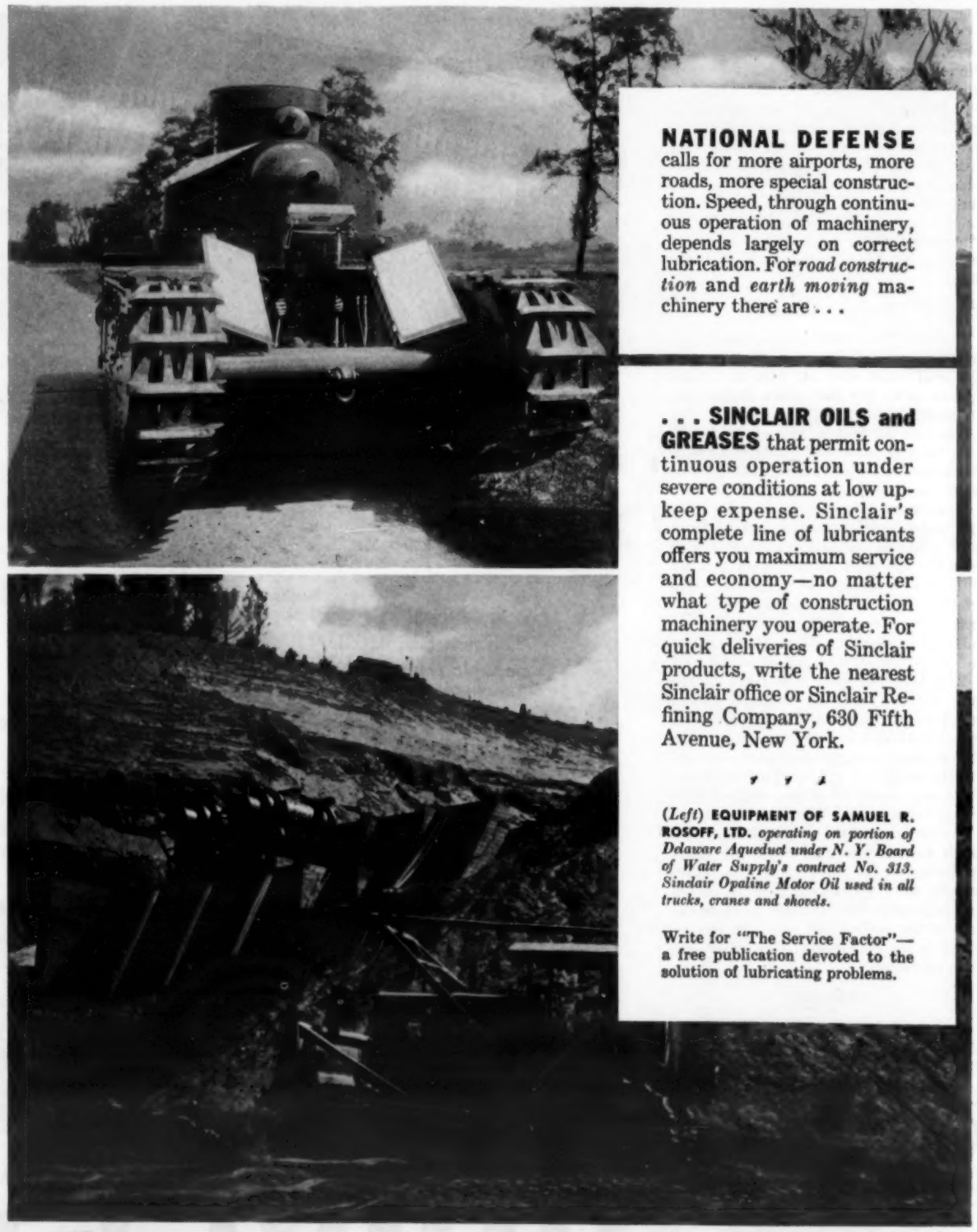
The blades are raised by either hand or power hydraulic as may be ordered, with the control valve within easy reach of the operator.

WRITE FOR CATALOG

Manufactured by

THE BURCH CORPORATION
Crestline, Ohio

Builders of Equipment for Fifty Years



NATIONAL DEFENSE calls for more airports, more roads, more special construction. Speed, through continuous operation of machinery, depends largely on correct lubrication. For *road construction* and *earth moving* machinery there are . . .

. . . SINCLAIR OILS and GREASES that permit continuous operation under severe conditions at low upkeep expense. Sinclair's complete line of lubricants offers you maximum service and economy—no matter what type of construction machinery you operate. For quick deliveries of Sinclair products, write the nearest Sinclair office or Sinclair Refining Company, 630 Fifth Avenue, New York.

* * *

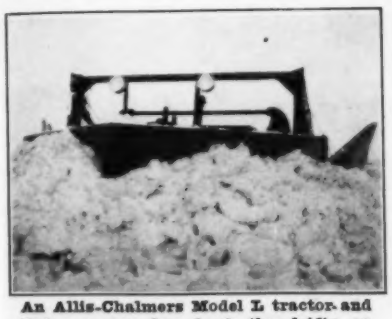
(*Left*) **EQUIPMENT OF SAMUEL R. ROSOFF, LTD.** *operating on portion of Delaware Aqueduct under N. Y. Board of Water Supply's contract No. 313. Sinclair Opaline Motor Oil used in all trucks, cranes and shovels.*

Write for "The Service Factor"—a free publication devoted to the solution of lubricating problems.

SINCLAIR LUBRICANTS-FUELS

SINCLAIR REFINING COMPANY (Inc.)

2540 W. CERMAK RD. CHICAGO • 10 W. 51ST ST. NEW YORK • 1907 GRAND AVE. KANSAS CITY • 573 W. PEACHTREE ST. ATLANTA • FAIR BUILDING, FT. WORTH



An Allis-Chalmers Model L tractor and Baker snow plow buck the drifts on Highway 37 south of Mitchell, S. D.

Motorists Demand Snow-Free Roads

South Dakota Keeps 6,000 Miles of Trunk Highways Open for Winter Travel in Spite of Severe Storms

✦ CHARGED with the task of keeping 6,000 miles of trunk highway open to travel 24 hours a day, 365 days each year, and constantly reminded of its job by an increasingly travel-minded public, the South Dakota Highway Commission and, more particularly, L. E. Vercoe, the Commission's Maintenance Engineer, see to it that, despite the severity of the storm, few winter blockades form on main roads in this state in the heart of the nation's snow belt. Faced with no small assignment, Mr. Vercoe depends on a modern mechanized force of snow-fighting equipment, well-trained crews and a pre-determined plan of attack for the successful execution of his task.

Snow removal in South Dakota parades before the Maintenance Engineer as complete an assortment of snow-removal problems, requiring a correspondingly complete assortment of snow-removal methods, as one might expect to find in half a dozen states. In the western section of South Dakota are the Black Hills, presenting all of the snow-removal problems of the mountains and forests. Fringing the Black Hills are the Badlands, great sunken, eroded valleys, the birthplace of many a swirling blizzard. Through the central and eastern parts of the state are the prairies and great plains where winds sweep with unmitigated force, blending together ice, snow and frozen dirt into tight, deep drifts that defy puny attempts to break through and tax man's ingenuity and machinery, calling forth his mightiest efforts to clear the highways of winter's drifts.

No part-time job, snow removal on this one-time range of the bison is a day-in, day-out assignment for five and sometimes six months of the year. From the first days of November until often well into April, wind-borne snows sweep the state. Even during the relatively light snow season of 1939-1940, the South Dakota Highway Commission expended $130,000 in removing snow, drifts and ice from trunk highways. That figure will be measurably boosted if this winter an "old-fashioned" snow season plays a Northwestern return engagement.

Varied Equipment Needed

As would be expected, the topography of the state has not only governed the type of snow-removal equipment selected for winter maintenance work, but the very diversity of the topography has necessitated a diversity in the types of equipment used in the different areas of South Dakota. In the eastern half of the state where the snow is heavy and drifting occurs most frequently, the Commission relies on rotary plows, while one-way truck plows are depended upon generally to clear roads in the western and Black Hills areas of South Dakota.

South Dakota's snow-fighting equipment ranges from tractors with V plows to rotaries. In the main, however, the state depends upon trucks. Lighter trucks are equipped merely with one-way plows but the winter gear of the heavier trucks is complete, including on each truck a V plow, mouldboard plow, wing and universal hitch. For the bulk of its snow removal work, the Commission depends upon the following pieces of equipment:

46 1½-ton truck plows
45 2-ton truck plows
48 3 to 7-ton truck plows
7 8 to 10-ton truck plows
3 snow wideners
2 rotary plows

Plan of Attack

Part of the success of the South Dakota Highway Commission in its snow removal work is due to a predetermined plan of attack. Maintenance Engineer Vercoe doesn't wait until the drifts start to pile up on the highways to decide how he is going about clearing the way for motorists. All that has been decided before. Summer-born strategy wins the winter war in this state.

As a first step in the winter campaign, the snow-removal equipment is spotted at strategic locations throughout the state where it will be most readily accessible and where the largest number of miles of roads can be cleared with the greatest despatch. The state is divided into five districts of approximately equal size. In each maintenance district, the snow-removal equipment is located at main points in county-seat towns where one or more highways may be served. This equipment is under the direct supervision of the district engineer in each district who, in turn, receives his orders from the main Commission offices at Pierre.

The district engineer is assisted by the maintenance superintendent in each district in supervising snow-removal operations. This district plan, dovetailing into a state-wide system, has worked out satisfactorily. In each district, snow-

(Concluded on page 30)

FORM WORK AND RICHMOND ARE SYNONYMOUS

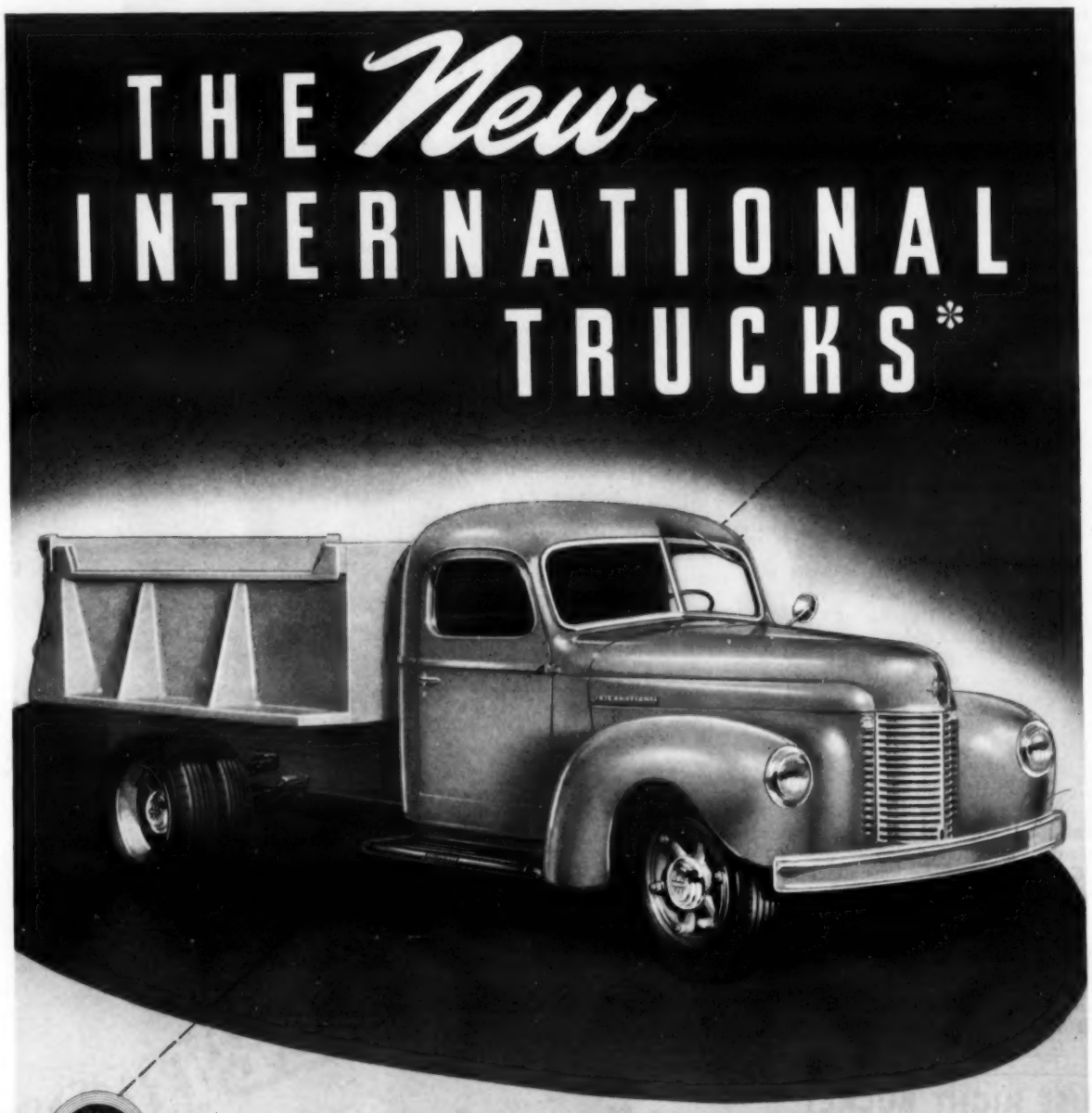
Army Camps, Naval Bases, Navy Yards and Ship Ways, Industrial Plants and Bridges are **Richmond-Tied**

See "Sweet's" 3-47

TIME AND LABOR SAVING CONSTRUCTION DEVICES FOR CONCRETE CONSTRUCTION

RICHMOND SCREW ANCHOR CO., INC.
838 Liberty Ave.,
Brooklyn, New York

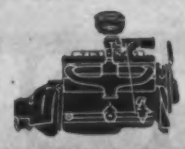
THE *New* INTERNATIONAL TRUCKS*



All-Truck Trucks *Better Than Ever!*

International Harvester is proud to present "The New Internationals"... beautiful in appearance, powered beyond requirements, engineered for unbeatable economy.

The heart of the remarkable economy in all the light-duty models is the new International-built Green Diamond Truck Engine...exclusively International.



The new Green Diamond Engine

The smooth performance of this power-giant, plus its sensational low-cost operation, make these new K-Line Internationals big money-savers on any hauling job.

There are new double-anchor hydraulic brakes; long, easy-riding springs; sealed-beam headlights; safety glass throughout; a new all-steel Safety Comfort-Cab; and many other features.

Phone any International Dealer or Branch for a *New* International demonstration. And write for a catalog.

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago, Illinois

Ingenious Tools Aid On Roadside Project

W. A. Corbett, Norman, Okla., Wins National Award for Cooperation and Ingenuity On Okla. Roadside Job

(*Photos on page 4*)

✦ THE contribution to roadside development for which W. A. Corbett of the W. A. Corbett Construction Co., Norman, Okla., won the 1940 National as well as the Southern Section Award in CONTRACTORS AND ENGINEERS MONTHLY Annual Roadside Development Awards was made on a 7.157-mile roadside development contract on U. S. 270 northwest of Oklahoma City, Okla. This $13,900 project consisted principally of landscaping and roadside betterment work following the construction of an 88-foot road bed in a 175-foot minimum right-of-way, with two 24-foot portland-cement concrete lanes divided by a 20-foot center parkway. This contract was awarded to Corbett on February 20, 1940, work started on April 2 and was completed June 22, 1940.

Poor Soil Presented Problem

The project traverses an area in which a very poor top soil is found overlaying a red calcareous clay and weathered Permian shale which is highly erodible, exceedingly hard to cultivate and therefore makes it difficult to plant grass for ground cover.

The contractor was not satisfied with the results secured with the ordinary farm-type plows in planting grass roots and decided to have built a heavier deeper running plow which would turn small clods rather than the usual large clods common to these soils, which remain tough and plastic when moist. After experimenting with several plows which he had made at a local blacksmith shop, Corbett secured one which he considered satisfactory. It consists of a double lister with a long pointed share and sharp cutting fin or coulter, like a dorsal fin, welded to the brow of the lister. This plow with its heavy steel beam was pulled by two teams and turned a ridge on either side of the furrow, making it easy to cover the grass roots in the furrow without dragging them out of the ground.

A commercial chemical fertilizer was then placed over the sodded area, using a grain drill with a specially-built fertilizer drill attachment also designed by Mr. Corbett. This ingenious attachment provided perfect distribution of the material without any waste from broadcasting or from the old-type drilling methods.

The Oklahoma State Highway Commission's plans and specifications called for rolling and compacting the area, after the completion of sodding and seeding, using an ordinary rolling-type compactor. Corbett conceived the idea of using a soil pulverizer or culti-packer weighted to provide 1,000 pounds per linear foot. After seeing this roller device in operation with an Allis-Chalmers farm tractor, the State Highway Engineers granted permission to use it. The resulting seed bed was remarkable, the Engineers report, as only small clods and finely divided small particles were present. To achieve this, it was necessary to make several trips over the more impervious soils.

Another item in the contract was "Bermuda strip sodding" which consists of furrows dug 5 inches deep and 10 inches wide at 2-foot 6-inch intervals horizontally on backslopes and at right angles to the flow line, in which Bermuda grass roots and top soil are placed and thoroughly soaked with water. Invariably this item is used where additional right-of-way is prohibitive and the resulting steep backslopes are a problem to excavate for the furrows. Corbett had several dozen hand adzes specially forged, handles shortened, and the bits bent so as to allow a full swing by the laborers who incidentally had to stand "short-legged" on the steep slopes. The resulting furrows were straight as a string line and of uniform depth and leveled to contour.

All trees and shrubs for planting were purchased at a local nursery approximately 5 miles from the beginning of the project. The plants were freshly dug as needed and hauled to the planting site, thus eliminating "heel-

(*Concluded on page 43*)

Strip sod furrows, 10 inches wide by 5 inches deep, being dug with hand adzes.

USE RIGHT BUCKET FOR THE JOB

Hayward makes all four—clamshell, dragline, electric motor, orange peel. A Hayward recommendation is unprejudiced.

—HAYCO—

THE HAYWARD CO., 32-36 Dey St., New York

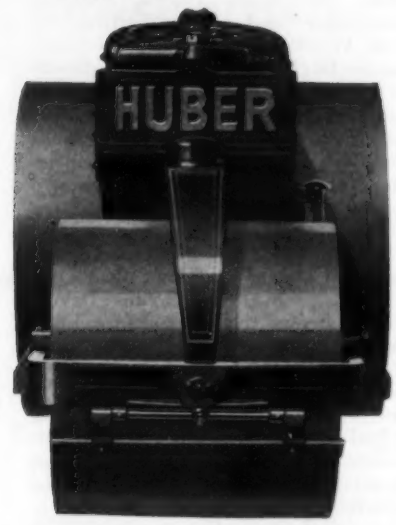
Hayward Buckets

STRAIGHTEN OUT those SURFACES at the LOWEST POSSIBLE Per Mile COST

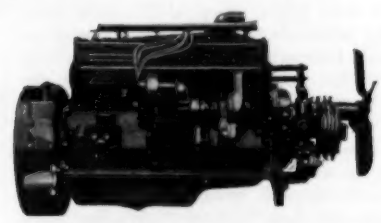
You can do it in "nothing flat" with a speedy, long life, low upkeep Huber. The reasons: HUBER ROAD ROLLERS are built with a full knowledge of their job; they have four speeds forward and four speeds reverse for rapid transportation and versatility in rolling; they have a short wheel base which makes them easy to maneuver; and together with the Huber hydraulic scarifier and Huber Tru-Plane make a combination that is hard to beat economically. And too . . . with a Huber . . . just push a button and away "she" goes. Every Huber Roller is now equipped with an Electric Starter. Check these and other important Huber features described on this page . . . and your next roller is bound to be a Huber.

THE HUBER MFG. COMPANY
MARION, OHIO, U. S. A.

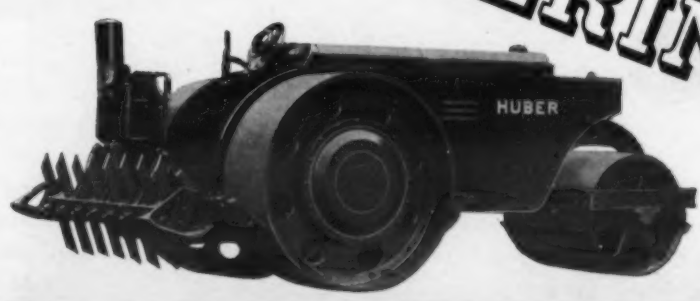
BIG! HUBER ROLLERS are sturdily built and properly balanced to meet the severest rolling conditions.



POWERFUL! The heavy duty 6 cylinder gasoline engines with which HUBER ROLLERS are equipped assure steady power without vibration and plenty of reserve to overcome all obstacles. Diesel power is also available if you desire it.



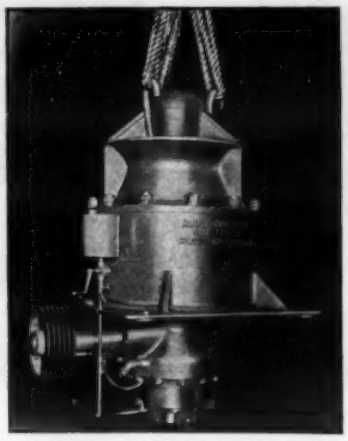
EASY STEERING! HUBER'S Dual Hydraulic Steering requires little effort on the part of the operator. All controls are centrally located for quick, easy operation. This also includes the new HUBER ELECTRIC STARTER button.



Be sure to write for catalog describing HUBER ROLLERS in detail.

HUBER Automotive Type ROLLERS

5 • 6 • 7 • 8 • 9 • 10 • 12 TONS



Unloading an Allis-Chalmers Type R gyratory crusher, and showing the Texrope drive below mounting level.

New Gyratory Crusher Added to A-C Line

The No. 636 Type R gyratory crusher, recently added to its line of gyratory crushers by the Allis-Chalmers Mfg. Co., has a 6-inch width of feed opening and a 36-inch diameter crushing head. Like the smaller size, the No. 322 Type R, it operates at high speed, has a crushing stroke selected for a high-capacity cubically shaped product, and is suitable for handling large tonnages of stone. Type R crushers are shipped assembled, ready to set on foundations without dismantling on arrival at the purchaser's plant.

This crusher is of simple all-steel construction. The spider and top shell are cast integral, and are readily removable for replacing its one-piece manganese steel concave ring and head mantle. Adjustment for taking up wear on this liner and on the head mantle is easily accomplished by means of a simple oil-filled hydraulic jack which supports the main shaft and is located on the bottom plate of the crusher. The jack, under normal operation, firmly holds the head and shaft in position for maintaining a uniform product, but the arrangement also readily provides adjustment for product size.

The crusher is driven by means of high-speed cut-steel gears, located in the bottom shell and operated in a bath of oil. The oil is cooled in an external cooling tank. The countershaft is driven by a flat-belt or Texrope drive from the motor or engine. Dust seals keep the working parts of the crusher clean, helping to reduce wear. Obstruction of crushed material is prevented by using an open-type bottom plate.

Further information on the No. 636 Type R gyratory crusher, a number of which are already in successful operation in plants throughout the country, may be secured direct from the Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Wide-Screed Finisher Used on Edison Bridge

The new Edison Bridge, across the Raritan River near Perth Amboy, N. J., was opened to traffic on September 20, 1940. In the completion of the concrete deck of the 4,385-foot structure designed under the direction of Morris Goodkind, Bridge Engineer, New Jersey State Highway Department, the contractors, John G. English, Inc., and Joseph Nesto & Co., of New York City, used a Flex-Plane finishing machine. The 52-foot roadway comprises a 26-foot center slab and a 13-foot slab on either side.

The illustration shows the adjustable-screed machine working on the 26-foot center section. The screed is 20 inches wide and built in two sections joined together with provision for setting or changing the front section to any height desirable above the second section, each of which is 10 inches wide. With the sectional screed it is possible to set the first section to the proper height to cut off exactly the proper volume of concrete necessary for the road slab after compaction, the compaction and finishing being done by the second section.

Another feature of the 20-inch screed is that it does away with the under-run or under-flow of concrete beneath the screed due to its width. Any excess water which rises to the surface is carried forward and does not pass under the screed as occurs at times with narrow screeds. The greatest factor from the contractor's point of view is the saving of concrete due to preventing under-run or under-flow. The Flex-Plane screed cuts and sweeps accurately so that it is possible to set the front section to the exact height desired; then, on making the second pass, practically no concrete is accumulated. It is best, however, to set the screed so that in making the second pass a very small quantity of material will be picked up to be worked over the surface.

C. & E. M. Photo

A Flex-Plane finishing machine with a 26-foot screed finishing the deck of the new Thomas A. Edison Bridge in New Jersey.

TURNPIKE ROLL CALL!

19 contractors on the Pennsylvania Turnpike used the following Gardner-Denver equipment:

PORTABLE COMPRESSORS:
WBG-315 Gasoline
Model 310 Gasoline
Model 220 Gasoline
Model ABJ Gasoline
WBF-210 Gasoline
WBE-160 Gasoline
WBD-105 Gasoline
WBG-315 Diesel
WBF-210 Diesel
ABH-420 Diesel

UM-99 WAGON DRILLS

SINKING DRILLS:
Model S-55 Model 11
Model S-45 Model S-79

PAVING BREAKERS:
Model B-72H Model 15H

DRIFTERS:
Model D-89B Model D-99

GROUT PUMPS

AGAIN Gardner-Denver *performance* created *user-preference* on the Pennsylvania Turnpike.

Again Gardner-Denver Water-Cooled Portable Compressors demonstrated their ability to deliver a constant, dependable supply of air at low discharge temperatures and low horsepower per cubic foot.

Again Gardner-Denver UM-99 Wagon Drills proved their convenience in handling wherever frequent moves over rough ground are necessary.

Again Gardner-Denver Rock Drills displayed their ability to drill more footage.

Whether your jobs are large or small, let Gardner-Denver rock-drilling equipment demonstrate for *you* its ability to deliver top performance, efficiently and at low cost. Get complete information from Gardner-Denver Company, Quincy, Illinois.

GARDNER-DENVER SINCE 1859

Contractors—Prevent loss of tools and other equipment with this EVERHOT Branding Iron

This inexpensive Branding Iron may also be used as a soldering iron or blow torch.

EVERHOT MFG. CO.
51 S. 19th St.
MAYWOOD, ILLINOIS

New Levee and Wall Ring Ironton, Ohio

Contracts and Hired Labor Under U.S. Engineer Dept. Complete Protection of a Town from Future Floodings

✦ A PROJECT which has included the use of hired labor by the U. S. Engineer Department for levee construction and contracts for concrete flood walls and pump houses at Ironton, Ohio, is reaching completion. This town, on the banks of the "Beautiful Ohio," has been made into a temporary Venice year after year by the winter and spring high waters. Ninety per cent of Ironton was under water in the famous 1937 flood when the waters rose to the second floors of most downtown buildings. The flood protection project was started in 1938 to use relief labor, and later contracts were awarded for certain essential structures.

Protection will be afforded by a combination earth levee and concrete flood wall with gates for the main highways and railroad lines for closure during high water, and six pumping stations to remove surface drainage and sewage from an area of 2½ square miles with a population of about 15,800. Contrary to one's general understanding of the Ohio River, it flows northward at Ironton. The city of Ironton furnished all right-of-way for the protection structures, provided the necessary borrow pits for material for the levees, paid for the railroad relocation and all public utility changes.

The ring of protection begins with a 4,613-foot earth levee at the south end of town along Ice Creek, running from high ground to U. S. 52, crossing it on high ground which was above the 1937 flood level but below the 3-foot freeboard level. This levee was built by hired labor and contains two pumping stations of the six built by Norton & Nadalin, contractor of Columbus, Ohio. The highway gate at Ninth Street is a concrete structure and the closure at Highway 52 is to be made by sand-bagging at this point. The present levee has a 3-foot freeboard based on the elevations of the record flood. The Ice Creek levee goes around the Semet Solvay coke plant and is wide enough at the top for a double track which is used to handle incoming bituminous coal and outgoing coke.

There is no levee along the river for a distance of approximately 3,600 feet because of the high ground. Then Gate No. 3 is built across the main line of the Norfolk & Western Railroad and a single track of the Detroit, Ironton & Toledo Railroad, made famous by its ownership by Henry Ford for a period. Gate No. 3 was built by the U. S. E. D. without interference to railroad traffic.

Next comes 1,941 feet of earth levee in which Gate 4 is located. It is built on a skew to take care of the relocation of a spur track. The levee is protected from erosion by riprap on either side of all gates and in other locations where the river current might tend to wash the levee. During the construction of the gates and pump houses many storm and sanitary drains, which were not recorded on any of the old city maps, were discovered and as they would have been possible causes of flooding of the city during high water, in spite of the new levee and concrete wall protective system, they were removed.

Just north of Gate 4 the city put in a 48-inch monolithic concrete interceptor sewer leading to pump station No. 3. This interceptor picks up a number of main sewers which previously had drained directly to the river. From Gate 4 the levee continues 4,496 feet to the north end of this levee section which is continued as a concrete wall.

The Pine Street Sewer

This Pine Street Sewer is an 8-foot monolithic concrete sewer which picks up a small stream at the east side of town and runs diagonally to Pine Street and then to the river. This was made over into a pressure conduit by lining with 2 inches of reinforced Gunite, and reinforced under the levee, because of the extra load, with an 89-inch corrugated metal pipe which was pulled through the sewer one length at a time by a tractor and a 4-part ⅞-inch cable. The pipe extends 30 feet upstream and 76 feet downstream from the center line of the levee. In order to insert the pipes, as it was impossible to connect

(*Continued on page 36*)

C. & E. M. Photo

Gate No. 1 in the ring of new levee and flood-control walls around Ironton, Ohio.

Complete Line of DERRICKS *and* WINCHES

SASGEN DERRICK CO.
3101 W. Grand Ave. Chicago, Ill.

OSGOOD

On the job near Hometown, Pa. The Contractor is D. A. Kessler Construction Co., Inc., of Mt. Carmel, Pa. The shovel on the left is an OSGOOD Model 900, on the right an OSGOOD Model 900 High Lift, both with 2-cu. yd. dippers.

SPEAKING OF ROCK—

there is plenty of it here, and yielding very nicely to the smooth, effortless control on these OSGOOD Model 900s.

Did you know OSGOODS have been moving rock for hundreds of satisfied owners, ever since Count de Lesseps first tried to build the Panama Canal in 1882-83?

Let us send you our new Catalogs. They tell all about OSGOOD.

The GENERAL EXCAVATOR CO.
Sizes: ⅜ - ½ - ⅝ - ¾
DIESEL - GAS - ELECTRIC
Associated with THE OSGOOD CO.

The HERCULES COMPANY
HERCULES "IRONEROLLERS"
6 to 12 Tons
Diesel or Gasoline
Associated with THE OSGOOD CO.

OSGOOD
Sizes: ½ to 2½ Cu. Yd.
Diesel - Oil - Gas - Electric
SHOVELS
DRAGLINES - CRANES
Crawler & Wheel Mounted
THE OSGOOD COMPANY, Marion, Ohio

New 1941 Catalog on Portable Electric Tools

The Black & Decker Mfg. Co., Towson, Md., now has available its 1941 60-page catalog covering its complete line of 132 portable electric tools. Each tool is described and illustrated, and specifications and prices are given. One of the new items is the ¼-inch standard ball-bearing drill. This tool was designed primarily for aircraft work and may be secured with either side or end handle. Another new item is the No. 95 Vackar, a super-powered vacuum cleaner for both automotive and industrial use.

Copies of this catalog may be obtained by those interested direct from the manufacturer by mentioning this magazine.

Soil-Cement Bureau Formed

In recognition of the fact that soil-cement mixtures are becoming of increasing importance in the construction field, particularly in their use for light-traffic roads, streets, at airports and roads at Army camps, the Portland Cement Association, Chicago, Ill., has announced the formation of a Soil-Cement Bureau. This new bureau will give added service to highway, airport and military engineers on all details of soil-cement testing, construction, specifications and use.

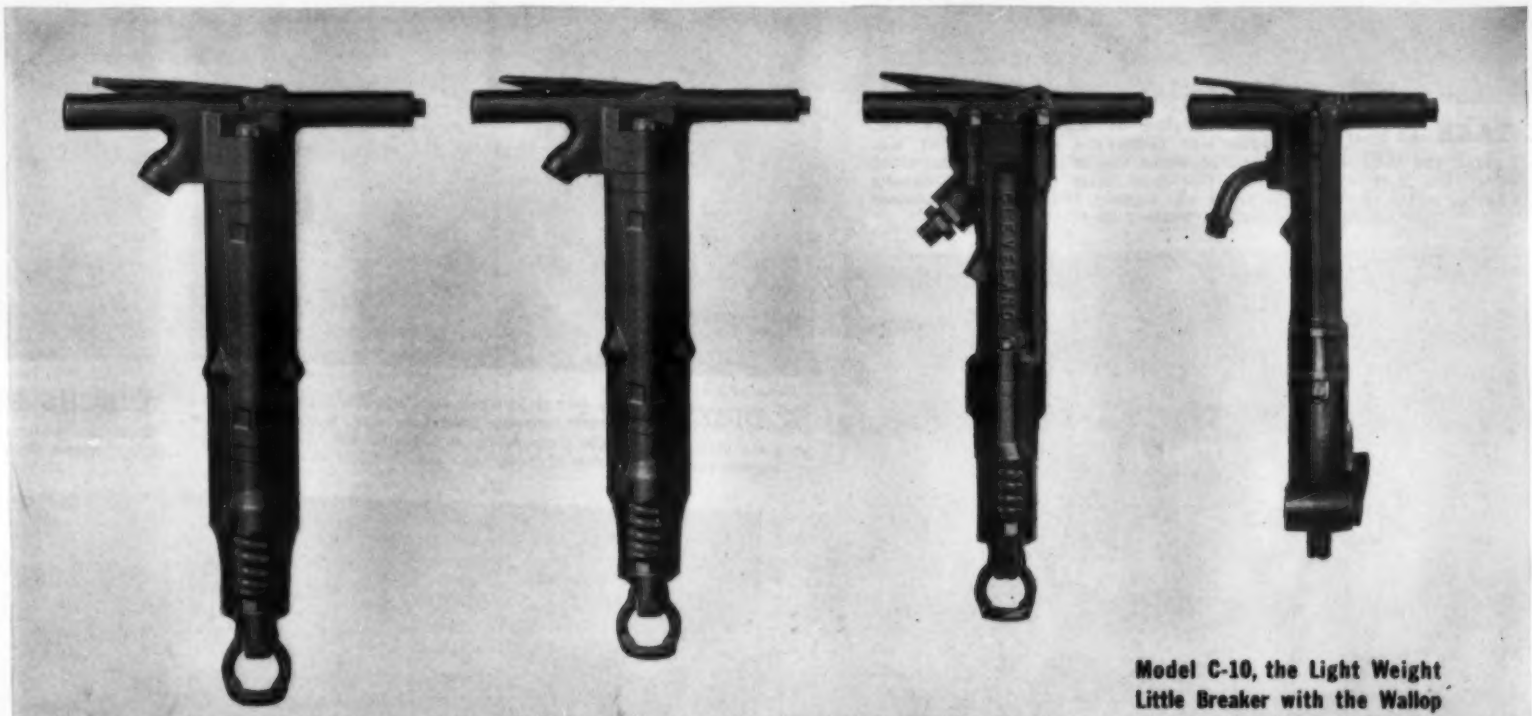
Miles D. Catton, who has been in active charge of soil-cement development since the Association started research in this field seven years ago, has been named the Manager of the new bureau.

New Roebling Boston Mgr.

Percy Jenkins, who has been with the Wickwire Spencer Steel Co. for more than 15 years, has been appointed Manager of the Boston Branch of John E. Roebling's Sons Co., 51 Sleeper Street.

New Sales Development Mgr.

L. C. Allenbrand has been promoted to the position of Manager of the Sales Development Division of Caterpillar Tractor Co., to fill the vacancy left by the appointment of G. E. Spain to the office of General Sales Manager. Mr. Allenbrand came to Caterpillar in 1931 as a special representative in the general sales department, after having served in various capacities with the John Deere Plow Co. since 1923.



Model C-9 for the Tough Job—the Hard, Well-Seasoned, Reenforced Concrete, and for General Paving Breaking.

Model C-7, the All-around Machine for Paving Breaking, Cleaning Slag Pits, for Ice and Frozen Ground, etc.

Model C-11, the Medium Weight Paving Breaker with the Long Stroke and Powerful, Slugging Hammer Blow.

Model C-10, the Light Weight Little Breaker with the Wallop that Surprises! Specify This One for Trimming, and for Jobs Requiring the Operator to Lift and Handle the Machine a Great Deal.

CLEVELAND PAVING BREAKERS

Line Up for Defense of the Nation!

It's a strong line, too, these powerful, sturdy, efficient machines made by Cleveland. There'll be no bottle-neck where the Government and private contractors put Cleveland Breakers into the advance guard of road, fortification, cantonment, and general paving and demolition work. For Clevelands DO turn out a better job, and at less cost for compressed air. This air economy is important in the operation of paving breakers, because they are all run from portable compressors. When you put a Cleveland Paving Breaker on your hose line, you know you are getting more work for every foot of air, and your compressor won't have to labor to keep up, either!

Cleveland Paving Breakers are in stock, ready to go out and show you a real job of paving breaking or demolition. Tell us where you want them delivered, and the size. That's all.

Ask us to send a copy of Bulletin 128 telling you "How to Get the Most Work Out of Your Paving Breakers." Fill in the coupon Now! Then mail it, and receive this helpful booklet FREE by return.

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If you are operating paving breakers, will you tell us what make and size?

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LEADERS IN DRILLING EQUIPMENT

IT CAN TAKE IT! When a soft shoulder at Headgate Dam, Parker, Arizona, gave way under the rear wheels of this 16-yard dump truck, the body went over the edge and the entire unit all but stood on end. However, the Heil Straddle-Mount telescopic hoist used on the chassis withstood the severe strain and when the truck was righted, it immediately resumed its normal operations of hauling dirt.

"ROAD OPEN" was the signal flashed to the residents of Culdrum Township, Morrison County, Minnesota, soon after a heavy drifting snowfall. The Township's Allis-Chalmers Model K tractor and Baker snow plow with wings cleared 12 miles of township highway west of Little Falls in the central part of the state with dispatch.

UNWATERING a trench at Johnstown, Pa., with a Sterling 4-inch centrifugal. Leo Butler Co. relaid 2,000 feet of 36-inch cast iron pipe under a U.S.E.D. contract for widening, deepening and paving the side slopes of the Little Conemaugh River.

Bureau of Reclamation Photo

A DIZZY WALK. High above the Pit River Canyon at the Shasta Reservoir site, workmen calmly rig a steel mesh catwalk preparatory to erecting the 17,010-ton steel superstructure for the highest double-deck span in the world.

Link-Belt News Photo

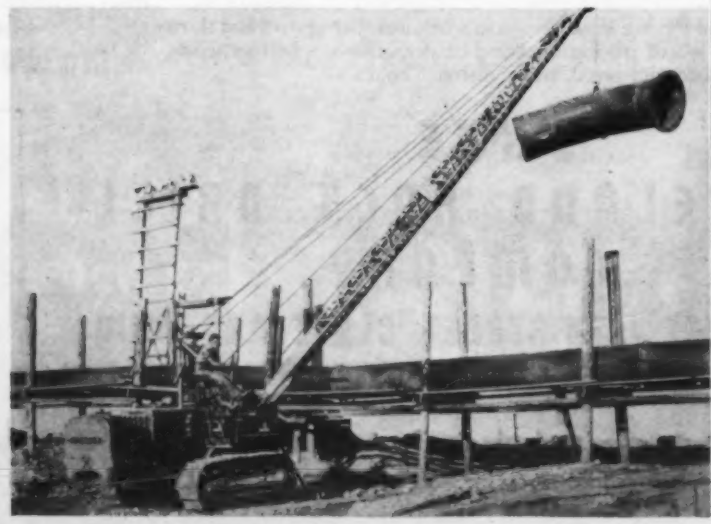
CIRCUS STUFF. [illegible]all, Pa[illegible] Co. a "Clyd[illegible] cub. [illegible] lion Leo which he has raise[illegible] hand which feeds him [illegible]on on [illegible]

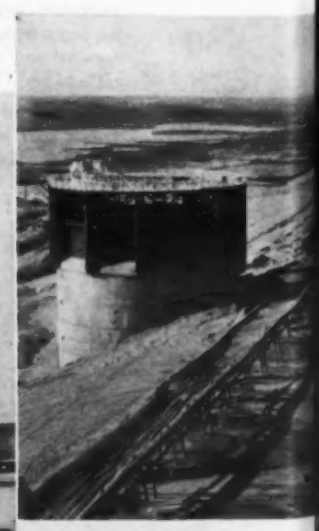
C. & E. M. Photos

FROST BOILS. This is one of a galaxy of [illegible] highway eruptions on Kent[illegible] 36, about 4 miles southeast of its junction with U. S. [illegible] The boil was about 8 inches high, 5 feet long, and 15 [illegible] wide on September 1, 1940, long after Jack Frost [illegible] pushed it up. At several nearby points water was [illegible] through cracks in the pavement, but evaporated [illegible] flowing less than 3 feet. Perforated pipe underdrains [illegible] used by many states and counties to remove subsur[illegible] water from pockets in clay or rock to prevent sin[illegible] damage to subgrades and light bituminous surface t[illegible] ments. This is a case of save the base and you save

EMERGENCY REPAIRS. During flood conditions, the Pennsylvania Railroad recently speeded up an emergency bridge repair job at night by using four portable Homelite generators, spotted on the river banks, to power floodlights and tools.

MOVE PIPE! A D6 tractor with a Link-Belt-Speeder boom placing a 1,500-pound section of dredge pipe at Kingsley Dam. The pipe builds up uniform "beaches" the full length of the dam.





SECOND LARGEST. [illegible] the Central Nebraska Public P[illegible] apolis Dredging Co.-Martin Wu[illegible]

...all, President of Iowa Mfg. Co., a "Clyde Beatty" with his pet ...raised cub. Leo goes easy with the ...him on Mr. Hall's estate.

Bureau of Reclamation Photo

"TOONERVILLE". One-car trains are the rule on the construction trestle at Friant Dam, Calif. Seven such trains, pulled by 10-ton diesel-electric locomotives, haul five 4-yard concrete buckets a trip, spotting them under the crane.

AMPHIBIANS. Modern crawler equipment takes to water or mud as readily as it does to dry land and thus is undaunted by whatever working conditions may confront it. On a relocation of Route 29, near Tamaqua, Penna., the D. A. Kessler Construction Co. of Mount Carmel, Penna., used a fleet of Athey wagons and D8 tractors, working 20 hours a day, to move 180,000 cubic yards of material. Each unit handled about 300 yards a day.

FACE LIFTING on the Skyline Drive. The Sutton Co., Inc., working near Waynesboro, Va., spread rock fill with a D8 tractor and LeTourneau Angledozer, while ...ast far away, at Afton, Walters & Prather finish up their grading with a No. 12 Caterpillar diesel ...grader. The Skyline Drive, one of the great scenic highways in Eastern United States, extends from Front Royal, Va., at the north end through Afton, where the grader at the right is shown working atop the Blue Ridge Mountains.

SKIDDING logs for a cofferdam on the TVA Cherokee Dam project near Jefferson City, Tenn. An Allis-Chalmers tractor with a Gar Wood bulldozer is shown hauling logs, while two C-P wagon drills prepare blast holes in the ledge below. Cherokee Dam will be 1 mile long, 160 feet high, and will cost $36,000,000.

PUSH 'EM UP! Wet dredged-gravel deposited near the slotted pipe line is used to form new dikes by spreading it uniformly with D8's and LeTourneau bulldozers at Kingsley Dam.

...rge P. Kingsley Dam, being built ...north of Ogallala, Nebraska, for ...Irrigation District by the Minne... Co., is the world's No. 2 earth dam.

DIRT ON THE MOVE. Heavy-duty construction equipmen... working in rough terrain at Nantahal... Dam in North Carolina. A Bucyrus-Erie 120-B is loading a 15-ton Eucli... truck, powered by a Cummins diesel, and owned by Utah Construction C...

This rotary plow on a Walter truck worked continuously for 42 consecutive days plowing snow in Wayne County, Pa. The tent-like effect in the truck body is the accumulation of snow for that period.

Pennsylvania's Plan For Snow-Free Roads

(*Continued from page* 1)

of railroad cars made it necessary to drive trucks and automobiles manufactured in Detroit and vicinity to the seaboard.

Pennsylvania was the first state to undertake snow removal on a perennial systematized basis. In 1921 the Pennsylvania Department of Highways assumed the responsibility for keeping 1,100 miles of road open for winter travel. The demands of traffic have made it necessary to increase this mileage each year since, until the 1940-41 snow-removal program has reached the record-breaking total of 19,236 miles of road. This represents an increase of 1,020 miles over last year's program. If normal weather and road conditions are prevalent during the present season, the cost of snow-removal service on the programmed mileage will be approximately $4,000,000.

The money required to finance the construction and maintenance of highways in Pennsylvania is received from the users of the highways, in the form of gasoline tax and licenses. The more traffic using the highways, the more revenue derived from this traffic; therefore, the large expenditure for snow-removal service in Pennsylvania is justified to keep transportation channels open so that they are available for full use by the owners of automobiles and trucks for the necessary interchange of traffic and transportation of commodities and supplies between the various sections of the state.

Regular Program

The regular snow-removal program covers only 19,236 miles of the 32,142 miles of improved state highways, but includes practically all of the mileage on which the average daily traffic is 100 or more vehicles. Provisions have been made to undertake snow-removal work on roads carrying less than 100 vehicles per day, after the programmed mileage has been properly handled. When roads of this class are blocked by snow drifts, they will be opened as rapidly as equipment can be released from the programmed mileage.

In preparing the snow-removal program for the year 1940-41, proper attention has been given to keeping all roads clear and safe for travel, both for ordinary traffic and that incidental to defense activities, such as troops on the march, transport trucks, motorized ordnance, increased local movements of automobiles and trucks around production plants, and the highway traffic incident to training camps and the step-up of miscellaneous traffic on the highways.

Preparations for such an extensive snow-removal program require long and careful planning. During the summer months thousands of tons of cinders and other abrasives are spotted at locations along the road where they will be required when the highways become dangerous for travel due to ice and slippery conditions. Early in November, 2,565 miles of snow fence is erected in windswept sections where drifting conditions make travel difficult. In November and December, trucks and tractors are repaired, if necessary, snow plows are mounted and this equipment is spotted at strategic points, with due consideration being given to the severity of snow and ice conditions on main highways where quick action is necessary to maintain uninterrupted safe and convenient traffic service.

Equipment Used

The Pennsylvania Department of Highways now has 953 trucks and has purchased and is now receiving delivery on an additional 249 trucks. These trucks range from the light 1½-ton models to the large 5 to 7-ton four-wheel-drive units. Also, 72 10-ton tractors and 263 power graders are used for snow-removal work. These units are used as motive power for snow plows, of which the Department owns 34 rotary plows, 1,493 blade-type truck plows, 89 V-type truck plows, 56 V-type tractor plows, and 130 V-type grader plows.

Of these snow plows, 326 are attached to rented trucks. Other snow-plow units are rented from private owners on an hourly basis, whenever they are available and needed. Most of this equipment is stored at the Department maintenance buildings which are located at the center of population in 66 of the 67 counties in the state. Some of the equipment is housed at strategic locations in outlying districts, where it can be placed in service in the minimum amount of time.

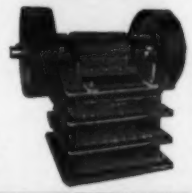
(*Concluded on next page*)

YOU can DEPEND on

DEPENDABLE—Long Life, Low Power Costs and Upkeep. Complete Safety

Bronze or Roller Bearing
JAW CRUSHERS
Heavy Armor plate steel or cast steel constructed. Large capacity. Small power requirements. Many sizes built—stationary or portable to meet your requirements.

GRUENDLER EQUIPMENT



Stationary or Portable
HAMMER CRUSHERS
Ideal for farm to market road work. Crushes stone to 1" minus or to fine agriculture dust.

For All Type Roads Whether Mountain or Farm to Market or State Highway

TWO-IN-ONE LIMESTONE PULVERIZER

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CRUSHERS · PULVERIZERS · GRINDERS

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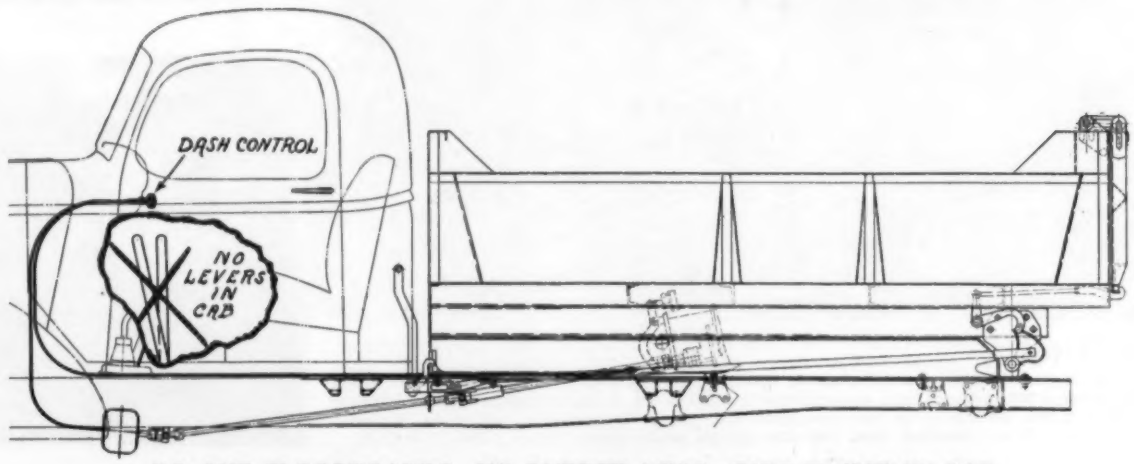
HOISTS and DUMP BODIES OPERATED WITHOUT LEVERS



NO CUT FLOORBOARDS—NO RUBBED LEGS—RIDE THREE IN CAB

The operator has only to push or pull two control buttons conveniently located on the truck dashboard, for easy and dependable operation of Hercules Hydraulic Hoists and Power Take-offs. Hercules units are engineered to eliminate all unnecessary and troublesome equipment. Therefore, large floorboard cab levers, which are awkward and difficult to operate as well as difficult to install, have been eliminated. "Button-Ease" dash controls are almost a necessity when making installations with third axle units requiring additional levers in the cab, and for cab-over-engine installations. (Dump body equipment which is less modern than Hercules can of course only be operated by old-fashioned floorboard levers.)

PISTON TYPE VALVE

Operation of Hoist and Power Take-off control buttons, both mounted on the truck dashboard, is made possible by incorporating a Balanced Piston Valve in the Hoist cylinder head. Easy operation of hoist is assured entirely independent of oil pressures. Piston Valve is entirely surrounded by oil, equalizing pressure on all sides of mechanism. Both the Balanced Piston Valve and "Button-Ease" dash controls are Hercules "FIRSTS," designed to give the dump body operator the full benefit of modern, tested engineering design.

WRITE FOR LITERATURE

HERCULES LIFT
Center Dump Hoist Bodies

HERCULES STEEL PRODUCTS CO. GALION, OHIO

Efficient Snow Removal Necessary for Defense

(*Continued from preceding page*)

Plan of Action

The Chief Maintenance Engineer, under the direction of the Secretary of Highways and the Chief Engineer, has the direct responsibility for snow removal throughout the entire state. The state is divided into eleven engineering districts and each district engineer has the responsibility for organizing the personnel, the distribution of equipment and the conduct of snow-removal activities in the counties in his district. There is a county superintendent in each county, who is responsible for the economical and efficient operation of equipment and personnel and who directs the snow-removal in his county.

The county superintendent's personnel consists of assistant superintendents, a chief mechanic, mechanics, equipment operators, foremen and laborers who are assigned to certain sections of roads. Each foreman is responsible for the condition of roads in his particular section and when cindering is needed he proceeds with the work at once. When snow plows are required, the foreman communicates with the individual on duty at the county maintenance building. There is always a competent employee on duty at the maintenance building and when reports of a snow or ice storm are received, the superintendent and chief mechanic are notified. The superintendent then reports to his office to direct the work and furnish accurate information on road conditions within his county. The chief mechanic is responsible for calling the snow-plow operators and dispatching the equipment. Snow plows are started when the snow reaches a depth of one inch and work continues until the roads are safe for travel. After the work is completed, the equipment is returned to its place of storage, repaired if necessary, and made ready for the next storm.

During an average storm of statewide proportions approximately 8,000 men are employed. Employees are permitted to work only a maximum of 12 hours in one continuous stretch, unless extreme emergency conditions exist. This restriction is imposed to prevent equipment operators from being exhausted through long hours of work under severe conditions, to prevent accidents resulting from strain and fatigue, and to insure the maximum efficiency in equipment operation.

Police Teletype Helps

In order that the Chief Maintenance Engineer may be able to keep in touch with the snow-removal work at all times, and give useful information to the traveling public, road-condition and weather reports are transmitted to the Central Office via the Pennsylvania motor police teletype system. These reports are transmitted at regular intervals. The regular reports are received at 8:00 a.m. and 3:00 p.m. Supplemental reports are submitted when a storm begins or when road conditions become worse than previously reported,

Pennsylvania Dept. of Highways Photo

A blade plow on a Chevrolet truck plowing snow on the William Penn Highway near Shellsville, Lebanon County, Penna.

or when a road is blocked to traffic. The county superintendent receives reports from his foremen in the various sections of the county and transmits this information to his district office by telephone. When the district office has received reports from all of the counties in the district, these reports are assembled and telephoned to the nearest Pennsylvania motor police teletype sending station, from where they are transmitted to the Pennsylvania motor police headquarters at Harrisburg. When reports from all of the districts have been received, a report on road conditions and weather is prepared in the office of the Chief Maintenance Engineer and sent to receiving stations, via Pennsylvania motor police teletype system, to every part of the state.

The cooperation of the Pennsylvania motor police in furnishing this service has resulted in providing accurate road-condition and weather information to all motor clubs, newspapers and police stations in every county in the state.

Ready for the Future

Past Performance indicates that the plans for snow-removal service during the year 1940-41 will be adequate for keeping all of the main roads open for the free flow of traffic at all times, but the officials of the Pennsylvania Department of Highways are continuously looking for better equipment and better methods for this work, keeping in mind the important changes facing them in the use of our highways as a result of the National Defense Program and realizing that the degree of change will depend entirely upon the development of wars in other countries of the world as it effects the necessity of stepping up national defense work in this country.

Do you wish a really superior dumping unit for handling 2-cu. yd. Detachable Buckets?

SEE OUR MODEL LF

(Load Forward)

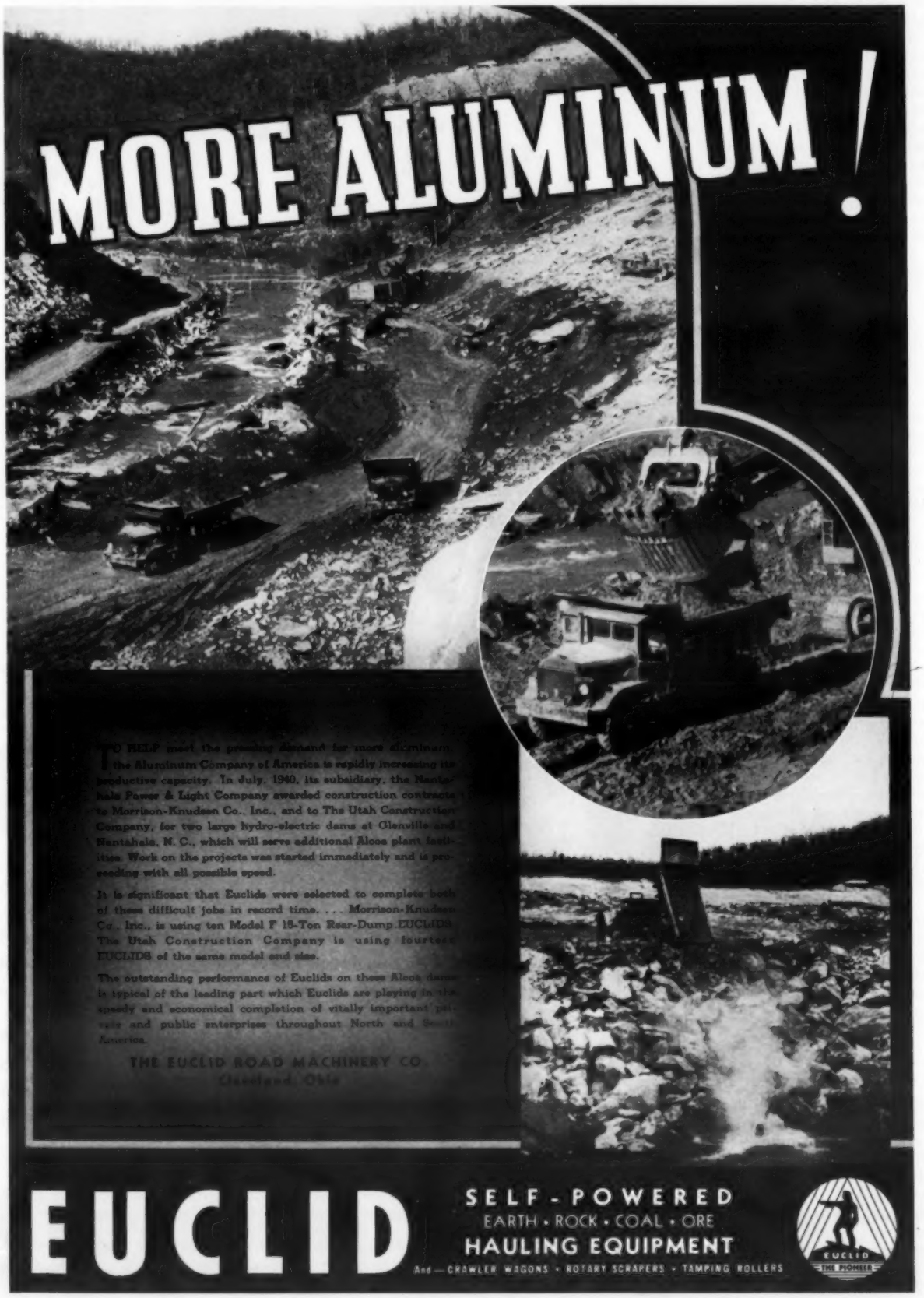
DEMPSTER DUMPSTER

For any 1½-ton truck

NO COUNTERWEIGHT OVERHANG SIDESWAY

All the load on the chassis.

DEMPSTER BROS. INC. Knoxville, Tenn.


MORE ALUMINUM!
TO HELP meet the pressing demand for more aluminum the Aluminum Company of America is rapidly increasing its productive capacity. In July, 1940, its subsidiary, the Nantahala Power & Light Company awarded construction contracts to Morrison-Knudsen Co., Inc., and to The Utah Construction Company, for two large hydro-electric dams at Glenville and Nantahala, N. C., which will serve additional Alcoa plant facilities. Work on the projects was started immediately and is proceeding with all possible speed.
It is significant that Euclids were selected to complete both of these difficult jobs in record time. . . . Morrison-Knudsen Co., Inc., is using ten Model F 18-Ton Rear-Dump EUCLIDS. The Utah Construction Company is using fourteen EUCLIDS of the same model and size.
The outstanding performance of Euclids on these Alcoa dams is typical of the leading part which Euclids are playing in the speedy and economical completion of vitally important private and public enterprises throughout North and South America.
THE EUCLID ROAD MACHINERY CO.
Cleveland, Ohio
EUCLID
SELF-POWERED
EARTH • ROCK • COAL • ORE
HAULING EQUIPMENT
And — CRAWLER WAGONS • ROTARY SCRAPERS • TAMPING ROLLERS
EUCLID
THE PIONEER

The new MultiFoote 34-S single-drum paver.

A New Single-Drum Paver in 34-E Size

After a year of successful operation on various types of concrete paving, the new single-drum 34-E MultiFoote paver has been placed on the market by the Foote Co., Nunda, N.Y. This new paver has a 34-cubic foot capacity plus 10 per cent on a 6 per cent grade, in accordance with AGC Standards, making a total capacity of 37.4 cubic feet.

In spite of its increased capacity, it is stated that the MultiFoote 34-E is compactly built and as easy to maneuver and transport as the 27-E machines. For transportation by trailer, the superstructure may be lowered by power after pulling out two pins. It is so designed that no water connections or other parts need be disassembled. One contractor has reported that he can get the machine ready for travel by trailer in approximately 10 minutes.

This new paver incorporates all the design principles of the latest model of the MultiFoote 27-E. Construction features include a double-cone drum, fully enclosed travel gears running in oil, Timken bearings on all high-speed shafts, a power take-off consisting of helical cut gears running in oil, a water system which is unaffected by line pressure or a change in grade. All mechanisms are readily accessible.

Further information on the new MultiFoote single-drum 34-E paver may be secured direct from the manufacturer by mentioning this item.

New Plastic Rock

A new Plastic Rock for use in patching concrete structures, pools, reservoirs, or for surfacing steps and concrete and wood floors has recently been announced by the United Laboratories, Inc., 16801 Euclid Avenue, Cleveland, Ohio. This Plastic Rock is supplied only in the form of complete units, each unit being composed of the proper proportion of Siloxide, setting powder, bond and asphalt paste. The units are mixed on the job by adding water and the resulting mixture is spread and troweled in the same manner as concrete. There are three grades of Siloxide available, fine, medium and coarse, the grading selected being governed by the roughness of the surface.

Further information on this Plastic Rock, which forms a tough rubbery surfacing which is claimed to be smooth, skidproof and resistant to wear, is contained in Report 220-C, copies of which may be secured direct from United Laboratories.

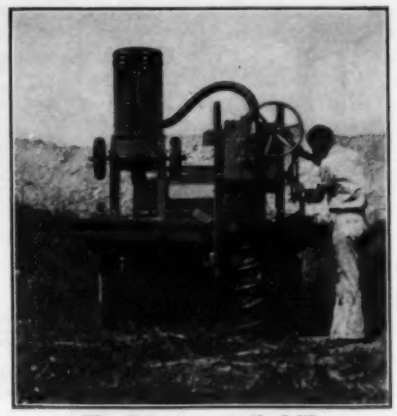
60 Years of Service

The Gardner-Denver Co., Quincy, Ill., recently commemorated the sixty years' service of J. W. Gardner, Chairman of the Executive Committee of the Board of Directors of the company. As a symbol of these years of service, Mr. Gardner was presented by his associates with a tiny gold, diamond-set model of a steam governor, recalling the fact that the present company grew from the original Gardner Governor Co., founded in 1854 by Mr. Gardner's father.

Truck-Mounted Drills For Cores, Post Holes

The Parmanco variable-angle earth drill is a complete unit ready for mounting on any standard 1 to 1½-ton truck, requiring only four bolts to secure it in position, and will handle an 8-inch drill at practically any angle. It will operate as a core drill to a reasonable depth, dig post holes, and can be used for service installation and small main jobs up to 100 feet.

Power is furnished by a 4-cylinder 16-hp air-cooled Wisconsin motor which is mounted on a swivel base with either a two or three-wheel carriage. Power is transmitted from a disc clutch through a 1¼-inch heavy-duty flexible shaft which connects to the drill unit proper where, through a series of reductions, the motor's 2,000 rpm is reduced to 125 rpm on the auger shaft where a self-aligning flexible chuck receives the auger. The drilling speed is under manual control, through an 18-inch hand wheel and a 15 to 1 worm and gear, to the shipper shaft which drives pinions on a cut steel rack. This machine, which is of electrically welded all-steel construction, is equipped with patented direction-control augers, from 4 to 8 inches, which are made of seamless steel tubing and are self-cleaning in any soil, according to the manufacturer.



The Parmanco earth drill.

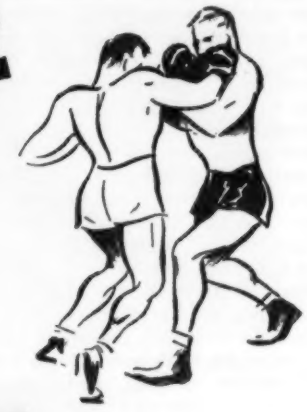
Bulletin 103 describing the Parmanco earth drill may be secured by interested contractors and engineers direct from the Paris Mfg. Co., Paris, Ill., by mentioning this item.

New Paving Breaker More Easily Handled

Easy handling is a necessity in tight places where operating a paving breaker. To fit in to this class, Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill., has developed the new No. 23 medium weight Thor paving breaker which is reported to be more powerful and lighter in weight. It is designed for general demolition of all kinds including street and wall openings, asphalt cutting, digging and the many odd jobs where only a single tool is needed. It can also be fitted with a special head for driving spikes up to 12 inches long.

Additional information can be obtained by writing direct to the manufacturer and asking for Bulletin No. MC-3500 CE.

4-POINT POSITIVE DRIVE



. . . gives the SNOW-FIGHTER what FOOTWORK gives the boxer

It takes *footwork* to put power in the punch of a champion. Likewise, it takes *100% Traction* to put power in the punch of a Walter Snow Fighter.

The amazing Walter Traction is produced by our peculiar Four-Point Positive Drive. This is the result of the combination of automatic lock or torque proportioning differentials, suspended double reduction drive with high ground clearance and minimum unsprung weight, scientifically correct weight distribution and tractor type transmission.

State, county and municipal road officials are finding the astonishing capacity of Walter Snow Fighters for work under punishing conditions, the best insurance for their communities against costly general traffic tie-ups.

Send for Literature

WALTER MOTOR TRUCK CO.
1001-19 IRVING AVENUE, RIDGEWOOD, QUEENS, L. I., N. Y.

State Maintenance Of Road Equipment

A Centralized Control of Decentralized Equipment Features Maintenance of Connecticut Machinery

+ LOGICALLY following through its policy of decentralizing the maintenance of state highways by dividing the state into eleven districts each under a District Supervisor, Connecticut has equipped each district with a maintenance shop for the care of the road machinery assigned to it. In order to continue a uniform policy throughout the state, the Head Property Examiner and two inspectors cover the districts regularly and make the final decisions on overhaul, repairs and replacements.

Equipment Distribution: Rental

In order to keep an accurate check on the cost of the equipment used by each district and in each type of work, all of the equipment, with a few exceptions noted below, is rented to the divisions by the state highway department. During the nine years this has been in effect, there have been a number of adjustments in the rentals but the figures are being standardized on new equipment. No rental is charged on snow plows because they are in a distinctive emergency service subject to particularly hard usage. Small tools are charged only to the overhead account of the district with a record maintained at the central office in Hartford of the tools requisitioned by each district. Tractor mowers are rented on a 12-month basis figured on the life of the machine and repairs. This makes the rental rather small for the summer period when the machines are in actual use but is basically correct as the mowers remain in the possession of the district throughout the 12 months of each fiscal year.

The eleven maintenance districts vary in size and consequently the amount of equipment varies. The discussion below covers the average amount of equipment for the districts, with the actual figures varying perhaps only 10 per cent either way.

Each district has an average of 24 trucks of the 3-cubic yard dump-body type, each one equipped with a pusher snow plow. Other equipment includes from one to three 1-bag concrete mixers, three portable belt loaders, one 1,300-gallon road oiler and one or more portable steam boilers for heating road oil, and one sand or chip spreader for covering the shoulders after maintenance oiling or after the surface oiling of the old waterbound-macadam and gravel roads. Each district also has two sanders for ice control but these have also been found effective for applying the final skin coat of sand or chips after oiling the road surface. Included also in the district list is a rotary sweeper for use on the shoulders ahead of the autumn oiling program. Two of these are operated by a power take-off from the light-weight trucks on which these sweepers are mounted.

Each district has varying numbers up to 10 or 12 old pulled graders which are used for the annual autumn shoulder maintenance work, being towed by the heavier trucks. Inasmuch as a considerable number of graders are needed for this work and the old light pulled graders are as effective for this particular job as the new power graders, this relatively large fleet of machines is continued in service although their actual turn-in or scrap value is negligible.

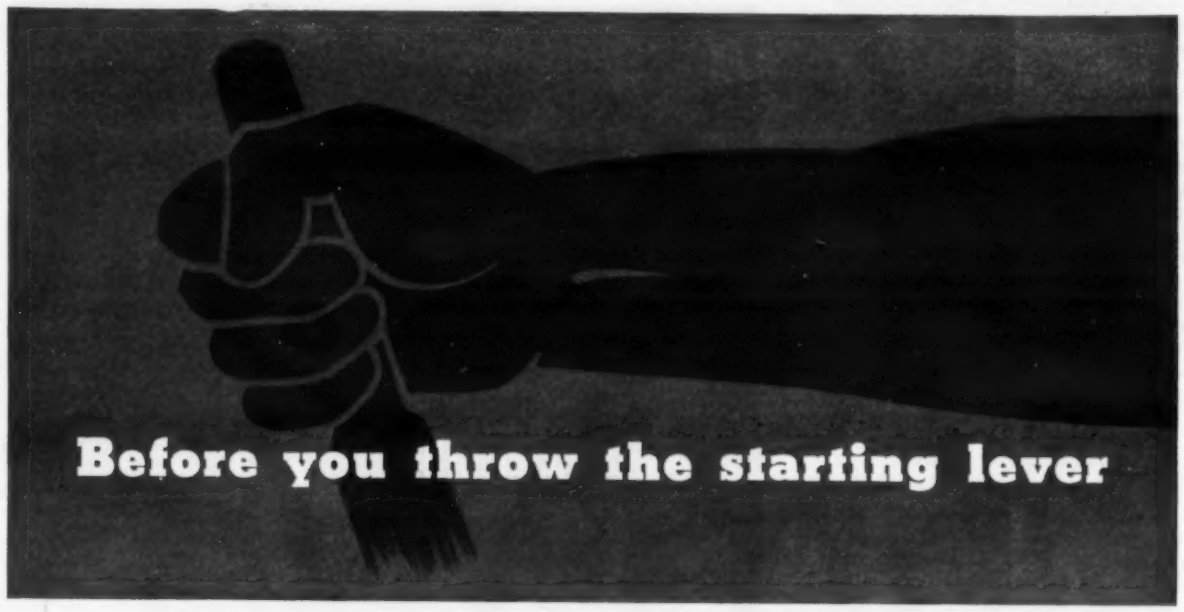
District Reports and Summaries

The following paragraphs are devoted to the different forms used by the Department and the districts to keep track of the condition, service rendered, and availability of equipment for transfer from one district to another.

A daily equipment time sheet is sent by each district supervisor to the central office at Hartford, showing the use made of each piece of equipment on rental to each district. These are summarized in Hartford according to the serial number of each piece of equipment which is used to identify it on the department records. The monthly summary shows the number of days each piece of equipment was in use each month, the number of days it was out of service under repair, and the number of days it was available for service but was not used. This monthly record is particularly valuable in showing when equipment is reaching its limit of usefulness and spends more time in the repair shop than in service, it shows the weaknesses of some newer equipment and also indicates if a district is overstocked with any one type of equipment. These records are studied carefully by the Superintendent of Property Control and the Head Property Examiner for indications of obsolescence or any other features which would indicate the need for replacement or transfer.

An 8½ x 7-inch form No. PRO-12 is prepared daily by each district supervisor and mailed to the Hartford office. This report is divided into three parts indicating: (A) equipment under repair; (B) equipment unserviceable; (C) equipment available for transfer. Under all of these sections the equipment is identified by its department serial number rather than by a description which might be misinterpreted. In the first section indicating that the equipment is under repair, the service order number issued by the inspector is entered and where the repair is being handled is shown, as some repairs are made at local garages in a few of the districts which are not fully equipped for the complete maintenance of their equipment. Equipment which is unserviceable is listed, with the reason why it is out of service, and equipment which is available for transfer includes a report on the date when it will be available for transfer. When this report is once

(*Concluded on page 35*)



Check your rope with TELFAX

The safety of your workmen and equipment hangs by a single set of steel wires. Before you throw a load onto these wires, make sure they're made of the correct grade of steel to handle that load.

Telfax—Bethlehem's identification tape—will tell you in a jiffy. This marker is laid next the core in Bethlehem Wire Rope. It is clearly marked with the grade of steel in the rope. As a double check, each tape carries an identifying color: Purple = purple strand; green = plow steel; red = cast steel, and so on.

When you consider that a ½-in. 6 x 19 Purple Strand rope has a breaking strength of 10.8 tons . . . and a ½-in. Cast Steel rope of similar construction has a breaking strength of 7.7 tons, you see the importance of the Telfax tape. Play safe. Use Bethlehem Wire Rope and check each length with the Telfax marker before using it.

BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

Guaranteed for One Year!

GRIFFIN

WELLPOINTS and PUMPS

Insist on this guarantee when next ordering dewatering equipment.

THERE'S A DIFFERENCE—INVESTIGATE

GRIFFIN WELLPOINT CORP.

725 East 140th St., New York, N.Y.

Phones: MElrose 5-7704-5

Highway Crews Battle Severe Storms in S. D.

(*Continued from page* 19)

removal crews are comprised of a truck or tractor driver with a snow plow operator and sometimes one or two helpers. These crews work under strenuous conditions and are "on call" at any time of the day or night during the snow months. The usual shift is 10 hours for each crew, but sometimes during severe weather conditions it is necessary to run the equipment continuously on a 24-hour basis. When these contingencies arise, the crews operate on a 12-hour rather than 10-hour basis.

South Dakota believes that a lightning war against the drifts is the best possible way to prevent clogged and blocked trunk highways, and consequently, when the snow starts falling, the equipment is ordered out. The procedure and pieces of equipment used depends on the snow fall. Light snows are taken care of by one-way plows whenever possible. As the snow falls become heavier and the drifts deepen, V-type truck plows are brought into use with tractor plows used for widening and clearing the spots that are too much for the trucks. The rotaries are used to augment the truck plows in eliminating the banks of snow piled up by the wings on the truck plows. Under extreme conditions when deep drifting occurs, it is sometimes necessary for plows to take out the snow in lifts. This is a hazardous procedure and the plows may be mired down in the twinkling of an eye if the operator is not skilled in handling his machine.

Use of Snow Fence

This state, in accordance with the practice in other states in the snow belt, attempts to prevent drifts on highways through the use of slat-type snow fence placed in the face of prevailing winds along roads in the wind-swept prairie country. Despite the fencing, however, drifts pile up and the equipment is called out to break through. One of the most difficult problems that develops in South Dakota's snow removal work is caused by drifting dirt freezing in with the snow when the thermometer is way below zero. The drifted dirt and snow freeze in such cohesion that it almost takes dynamite to blast away the drifts.

Emergencies

Although the Commission makes every effort to open all trunk highways during or immediately after a storm and has an excellent record in maintaining main roads open to traffic at all times, emergency calls during winter months take precedence over all other calls. Scarcely a snow storm of any intensity arrives without calls from doctors and morticians for assistance in reaching sick persons and those beyond aid.

"And," adds Mr. Vercoe, "you would be surprised at the number of babies that are born during a storm."

The motoring public is more insistent each year that all main routes, and sometimes routes of lesser importance, be maintained in good driving condition regardless of weather. The South Dakota Highway Commission attempts to meet these demands at all times and keeps the public informed on the condition of trunk highways throughout the state with regular broadcasts over main radio stations. Sometimes, however, roads do become blocked for as long as 12 hours and then the Commission's troubles begin.

"When we inform the public that the roads are not in good condition due to shifting and drifting winds," says Mr. Vercoe, "or when we broadcast a report that some highway will not be open until later in the day, the average motorist believes us only after he has a severe case of frost bite on both his ears and probably his feet. It is our experience that most motorists are fair-weather travelers. They generally leave their snow shovels and chains at home and forget to wear their caps. And they never can locate a pair of mittens when they get stalled in a snow bank."

USE Fulton
TARPAULINS · · ROAD MATS
WINDBREAKS
CONTRACTORS' SUPPLY DEALERS in every state sell the Fulton line. Specify SHURE-DRY and FULTEX Tents, Tarpaulins, and Windbreaks—anything made of canvas. Also Fulco Road Mats and Burlap.
If your dealer can't supply you, write our nearest plant for catalog, samples and price list.
Fulton Bag & Cotton Mills
Manufacturers Since 1870
ATLANTA ST. LOUIS DALLAS NEW YORK
MINNEAPOLIS NEW ORLEANS KANSAS CITY, KAN

Welding Answers Call On Grader Break-Down

Failure of the steering spindle of a road grader recently operating 3 miles from Wooster, Ohio, threatened interruption of work until replacement parts could be obtained, which would have required several days. This delay was considerably reduced, however, by calling the Albright Welding Shop in Wooster which dispatched to the job its service truck, equipped with a 200-ampere Lincoln welder, and restored the grader to service on the same day.

The operator welded the broken rod together, then applied a ¾-inch round bar 5 inches long, bent it to the shape of the steering rod and welded it to the steering spindle. When the work was done, the spindle was as strong as ever.

Before the service truck left, two other repairs were made to the road equipment on the job. One repair consisted of welding a bracket, which had become loose, to the blade of the grader, and the other job consisted of building up the end of a worn axle on a power shovel. Weld metal was applied in beads over a distance of about 3 inches from the end of the axle, restoring the part to its proper size.

Repairing a grader blade on the job.

CHEVROLET
1941 TRUCK

Out-Pulls Because Chevrolets have the most powerful truck engines in the low-price field and develop their maximum pulling power at low engine-speeds. You don't have to "race your engine" to lug your heaviest load. Chevrolet's Standard engine gives you 90 horsepower and 174 foot-pounds torque, and its special "Load-Master" engine for Heavy Duty models (optional at a small added charge) gives 93 horsepower and 192 foot-pounds torque.

Out-Values Because its 60 models on 9 longer wheelbases embody Chevrolet's traditional qualities of economy, reliability and long life, developed to new heights for 1941, plus such extra-value features as massive new truck styling, new recirculating ball-bearing steering, larger and more comfortable driver's compartment.

Out-Sells Because the nation's truck users have learned that Chevrolet is the best buy, as an investment that will pay the maximum dividends in high-efficiency operation at low cost, and have backed their judgment by making Chevrolet the sales leader year after year.

Inspect these
NEW 1941 FEATURES
★ TWO NEW VALVE-IN-HEAD ENGINES . . . STANDARD: 174 FOOT-POUNDS OF TORQUE—90 HORSEPOWER . . . "LOAD-MASTER": 192 FOOT-POUNDS OF TORQUE—93 HORSEPOWER* ★ NEW RECIRCULATING BALL-BEARING STEERING GEAR ★ NEW, MORE COMFORTABLE DRIVER'S COMPARTMENT.
*Optional on Heavy Duty models at extra cost
60 MODELS
ON NINE LONGER WHEELBASES . . . A COMPLETE LINE FOR ALL LINES OF BUSINESS

CHEVROLET MOTOR DIVISION, *General Motors Sales Corporation*, DETROIT, MICHIGAN

Aerial Photos Used In Planning Highway

Aerial photographs are replacing the usual field survey in planning a modern express highway now under design for the City of Detroit. When finished, the photographs, which are taken from a height of 3,000 feet, will be made into a mosaic strip map on a scale of 40 feet to the inch. It will measure 154 feet and will show 14 miles of Grand River Avenue, parallel to which the proposed highway will run.

The Michigan State Highway Department, in charge of the work, reports that the photographs, which were taken in a few days' time at a cost of $800, are an efficient and accurate substitute for work that would cost $8,000 under the usual field surveying methods.

The Department first used aerial pictures in 1924 to guide in planning new roads, but the present project is the first one in which they replace field surveys altogether, it is reported.

New Small Floodlight

The G-E Type L-65 100-watt floodlight is a handy, inexpensive, lightweight and weatherproof light designed for emergency service, for lighting night construction or for repair work. The reflector is made of etched aluminum which, it is stated, will not peel, discolor or deteriorate. A circular steel base holds the light upright at all times, and may be mounted in any position. The light is furnished complete with heat-resisting door glass and 6 feet of rubber cord with molded plug.

The G-E 100-watt floodlight.

Further information on the G-E Midget-Handy floodlight is contained in a folder, GED-866, copies of which may be secured direct from the General Electric Co., Schenectady, N. Y.

Engines and Power Units

The Hill R Series engines, according to the Hill Diesel Engine Co., Lansing, Mich., meet the power needs of diesel electric generator sets of 5 to 20 kw; or for engines for direct power of 10 to 35 hp; auxiliary units comprising engine, generator, compressor and pump, and various other power and utility combinations.

Complete information, including specifications, dimensions and weights, is contained in an illustrated circular, No. 39, copies of which may be obtained direct from the manufacturer. If your light and power requirements are above 20 kw or 35 hp, write for the bulletin on larger Hill diesel generator sets, power units or utility combinations.

10 QUESTIONS to ask a SPREADER SALESMAN

1. Will your spreader put down with almost absolute uniformity (98-99% accuracy on many jobs) everything from a fine sprinkle of sand to a 1½ inch layer of stone?
2. Will it do this regardless of truck speed?
3. Will it operate in reverse equally as well as forward?
4. Will it taper the spread—thick on one edge, thin on the other?
5. Will it handle all materials within its range equally as well?
6. Will it handle wet or slightly sticky material equally as well as dry material?
7. Will it spread strips of various widths?
8. Can one man quickly couple or uncouple it from the truck?
9. Can it be put in "neutral," that is can the distribution of material be stopped easily by a lever control while the spreader is in motion?
10. Will it spread close to roadside obstructions or close to the shoulder without riding on the shoulder?

..AND HERE'S THE *Answer*

THE answer to every one of these questions is: "Yes, if it's a BUCKEYE Spreader!" This machine is second to none for accurate, low cost spreading. It saves 20% and more on labor and material, cuts cost and does a better job. A strikeoff attachment is available for spreading courses of heavy stone up to 6" in depth.

Before you buy a spreader be sure to get a copy of the 8 page bulletin on BUCKEYE Spreaders. It shows you in detail the mechanical features of the machine, tells what users have to say about it. Read it, and then judge for yourself. Write today!

BUCKEYE TRACTION DITCHER COMPANY
Findlay, Ohio

See Page 5

Built by **Buckeye**

C. & E. M. Photo
Buggying concrete from the Jaeger 3-bag mixer to the wall forms.

Difficult Excavation For Underpass Job

(*Continued from page* 11)

excavation was again started, with the shovel working against an almost vertical face of clear ledge. The clay formation started caving in because it was saturated. The face seemed to be practically filled with tile and other drains which had been put in at different times by different groups responsible for the maintenance of this traffic intersection close to the center of Bethel.

In order to check the disintegration of the face, the contractor started driving 18-inch Bethlehem sheeting with a ½ x 6-inch webb 3 feet back of the neat line of the forms. This sheeting was driven with a McKiernan-Terry No. 6 steam hammer, swung by a Lorain 55 crane and supplied with steam from a portable boiler. The ground broke behind the sheeting and some of it fell around the ends. Because of this condition the sheeting was heavily braced with large timbers and pieces of sheeting. A section between the disintegrated ledge and the sheeting was filled with clay and stone from the excavation so that no further slippage would occur.

Drilling in the rock was handled by two Cleveland jackhammers and one Sullivan wagon drill, with a Sullivan and a Worthington portable compressor furnishing the air. The wagon drill holes were only carried to a depth of 6 feet as it was not possible to set up the wagon drills on the top of the ledge. Jackhammer holes were carried vertically to 14 feet and worked out very satisfactorily. All drills were equipped with Timken detachable bits, and the holes were shot with 40 per cent Atlas dynamite. The shattered rock was loaded out with the Lorain 55 to an Autocar 8-yard truck but when the space became cramped, Ford V-8 dump trucks were used instead.

A novelty of this part of the work was the itinerant blacksmith, Francis Rhoades of Randolph, Vt., who has his forge and anvil mounted in a covered truck. He sharpened picks, mended chains, and did other odd jobs as required on this contract, and reported that he is kept busy shoeing horses in the farming section and picks up a good living doing work for contractors and for the Vermont State Highway Department.

Temporary and Permanent Drainage

As the work progressed and the water in the ledge drained out, it was necessary to keep a 4-inch and a 2-inch Jaeger Sure-Prime pump busy unwatering the low portions of the work and delivering the water to the new drainage system which was installed permanently to take care of the bad water condition of this site.

The permanent drainage system consists of a continuous 8-inch bituminous-coated perforated corrugated-metal pipe laid along the back of the wall close to the footing with three outlets through the footing consisting of 8-inch pipe through the wall leading to three catch basins in front of the wall. These in turn discharge through 12-inch pipe to a central catch basin located in the middle of a grass plot midway between the retaining wall and the underpass. The wall is also well protected with 4-inch vitrified tile weepers installed at about 10-foot centers just above the finished grade of the new roadway.

A Lorain 40 was used to dig the sanitary sewer trench and also all of the trenches for the under drains.

(*Concluded on next page*)

Closed Type

WARCO J and S TRACTION TREADS

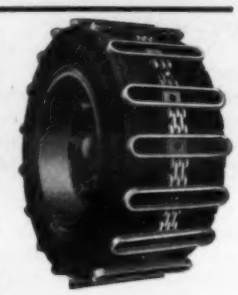
NOW AVAILABLE WITH

CLOSED or OPEN Type SHOES

Over ice, snow, sand, loose ground or mud, your trucks will come through if equipped with J & S Traction Treads. *Write for circular.*

W. A. RIDDELL CORPORATION

Bucyrus, Ohio



Open Type

BACKED BY A RECORD

You can get your teeth into!

Ever stop to think—*"Why so many Ford Trucks?"* Ever look into the record of these powerful, trustworthy units? Here it is—a record that clearly demonstrates Ford performance, economy, reliability!

THE RECORD: More Ford Trucks have been built, and more are in use this minute than any other kind.

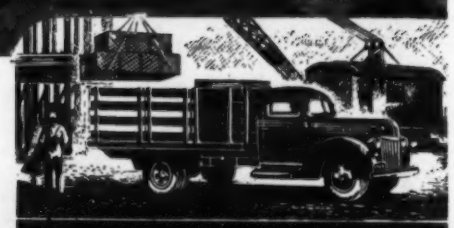
THE RECORD: Ford Trucks give amazing economy—shown in actual cost records of truck operators throughout America.

THE RECORD: Ford Trucks have extra big and extra sturdy brakes, axles, clutches, frames—there's a host of Ford Truck features that challenge comparison!

When you choose a Ford unit you get the just-right unit for your job! 42 body types. 6 wheelbases. Power choice of 85 or 95 hp engines.

Ask your Ford Dealer to prove Ford low cost and high efficiency on *your* job with *your* driver! Make this test and check the record.

Ford



FORD TRUCKS

AND COMMERCIAL CARS

COMPACT—POWERFUL—SAFE

"For use where power is not practical or available"

Manufactured in 2, 5 and 15-Ton Sizes. For capacity comparison, ½" cable used:

2-Ton "Lightweight" ..... 75 ft.
5-Ton "General Utility" ..... 256 ft.
15-Ton Triple-Geared "Special" ..... 1200 ft.

Patent instant gear change and positive internal brake that never fails, and will lock load.

Gear Ratios	Weight	Price, f.o.b. Seattle
2-Ton 4, & 22 to 1	60 lb.	$ 50
5-Ton 4, & 24 to 1	110 lb.	$ 75
15-Ton 4, 19 & 109 to 1	680 lb.	$250

BEEBE BROS.

2724 6th Ave., So., SEATTLE, WASH.

Warehouse stocks for dealers' Supply: Seattle—Chicago—Brooklyn—Houston. Complete Literature and List of Dealers in Principal U. S. Cities and Foreign Countries Gladly Mailed.

C. & E. M. Photo
A completed section of the retaining wall at Bethel, Vt.

New Underpass and Wall On Vermont Route 12

(Continued from preceding page)

Forms and Concreting

The width of the footing for the retaining wall varies from 6 feet 4½ inches to 12 feet 1⅝ inches, and the wall is battered 5 inches per foot on the back and ¼ inch per foot on the front. The back line of the wall is the curb line of the sidewalk and is consequently held straight. The wall is 10⅜ to 12 inches thick at the top and the top 9 inches of the wall is plumb to form a straight curb.

Before the concrete was placed in any of the separate 20-foot sections into which the wall is divided by ½-inch cork expansion joints, each section was carefully cleaned by hand, removing all loose stone and mud and then baled out. Where it was particularly dirty the ledge was hosed down, allowing the water to flow into the next lower section.

The forms were built up with ¾-inch plywood supported by 2 x 6-inch studs on 15-inch centers and double 2 x 6-inch wales. The contractor devised a novel scheme to permit pouring the concrete without dropping it more than the specified 5 feet, and still to complete the forms to their full height at one time. An opening was cut between two studs, leaving an opening about 15 inches square and then a sloping baffle board was nailed at the bottom of the opening sloping into the forms. In this way the space between the two studs acted as a chute and the concrete could be easily placed without using elephant trunks or other cumbersome chuting equipment. Where this method could not be used, coal chutes were used.

Because of the pressure on the sloping backs of the forms when the concrete was poured, they were tied down to bolts cast in the footing to prevent lifting. Richmond Ty Screws were used inside of the forms to maintain the proper spacing.

The aggregate for the concrete was stockpiled on wooden platforms and then hand-shoveled into wheelbarrows and each load weighed on one of the two Fairbanks wheelbarrow scales. There were three wheelbarrows used for stone and two for sand, with one man wheeling each one. At the skip of the Jaeger 3-bag mixer, one man dumped the cement, another operated the mixer and two men wheeled the rubber-tired concrete buggies to the forms where an extra man helped dump the buggies and clean them. City water was used for the concrete mix.

All the concrete above the footing was vibrated in place with a Mall gas-engine powered mechanical tube vibrator.

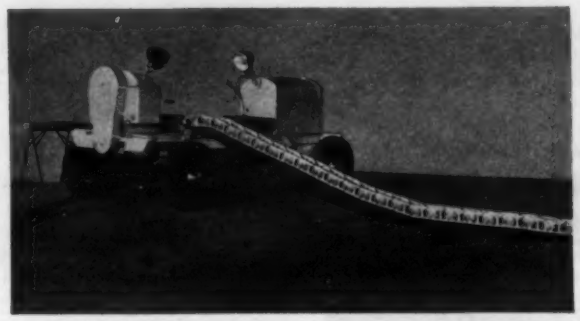
Personnel

The contract for the underpass on Vermont 12 at Bethel, Vt., extending a total of 0.218 mile, was awarded to the Littleton Construction Co. of Littleton, N. H., on its low bid of $78,436.00. For the contractor, Thomas P. O'Brien was Superintendent, and for the Vermont Highway Department, R. F. Taylor was Resident Engineer.

Trailer Track Press

The repair of crawler tractor tracks is a regular part of tractor maintenance, the frequency depending on the severity of conditions under which the tractors are operating. Many contractors on jobs where a number of tractors are working include in their repair shops a track repair press to handle this work.

Such units, both portable and stationary, are made by Rodgers Hydraulic Inc., 721 Laurel Ave., Minneapolis, Minn. With these powerful presses it is stated that a set of large tracks can be properly repaired in less than 3 hours' time, including setting up the roller bed, mounting the tracks on the roller bed and frame, turning or replacing pins and bushings. Spacing the rail links is automatically taken care of with the Rodgers new retractable jaw assembly.



Placing track on a Rodgers track press preparatory to repairing the track.

Rodgers trailer track presses are made in two styles, the four-wheel and the two-wheel, and are powered by a Ford Model B 4-cylinder engine. A new type is the Rodgers combination track and general purpose press. This unit, like all other types, is available in a trailer or stationary model, and is an all-purpose press.

The smaller contractor, who does not have sufficient repair work to warrant the purchase of large equipment, will find efficient hand-operated track units among the many Rodgers models.

Further information on Rodgers trailer track presses may be secured by interested contractors and state and county highway engineers direct from the manufacturer.

THE URGENT NEED for speed in the national defense program of airport, cantonment and industrial paving finds The Barrett Company ready. A nation-wide network of Tarvia plants, a fleet of Barrett tank cars and Tarvia application equipment, and a staff of specially trained highway engineers are equipped to facilitate construction on a big scale. Behind these Barrett resources stands a long record of successful experience in solving similar problems during the war time days of 1914-18. Engineers and contractors working against time will find the use of Tarvia and Barrett service an efficient short cut to uniformly satisfactory results.

Barrett Tarvia
GOOD ROADS AT LOW COST

THE BARRETT COMPANY New York Chicago Birmingham St. Louis Detroit Philadelphia Boston Providence Lebanon, Pa. Rochester Baltimore Minneapolis Cleveland Columbus Toledo Youngstown Syracuse Hartford Buffalo Cincinnati Bethlehem Portland, Me. Norwood, N. Y.
In Canada: THE BARRETT COMPANY, LTD. Montreal Toronto Winnipeg Vancouver

...ONE OF AMERICA'S GREAT BASIC BUSINESSES

The new Osgood ½-yard excavator.

New Small Excavator Compact and Rugged

By simplifying and balancing the design, a new ½-yard excavator, convertible to any type of service and designed for crawler, standard truck or special wheel mounting, has been produced by The Osgood Company, Marion, Ohio. This Type 20, Model 200, ½-yard machine is powered with either gasoline or diesel engine and power is taken direct from the engine to the swing and travel shaft by a triple-strand roller chain, fully enclosed, and equipped with sight-feed lubrication.

There are two cross shafts on the upper deck and only one on the lower frame, the countershaft being eliminated. The two horizontal shafts are mounted in roller bearings, carried in the side frames. The clutches and brakes on the swing and travel shaft are of large diameter, wide faced, and controlled by a hand lever at the operator's position. Dirt and foreign matter are kept out of the vertical shafts, the reversing swing, intermediate, and travel shafts, by recessing them in the deck and enclosing them. This also reduces wear and replacement parts by keeping the lubricant clean.

The boom hoist is a separate unit mounted in the left-hand side frame and is equipped with a self-locking steel worm and bronze worm wheel. The crowding sprocket is mounted on the right-hand drum which is the hoisting drum for crane, dragline and clamshell operations. For quick change from shovel to crane, etc., the crowding sprocket used for the shovel, and the lagging used for the other types of service, are mounted on the drum in two pieces, eliminating the necessity of removing the drum in making the change.

Specifications and details of the new Type 20 ½-yard excavator will be sent to readers writing to the manufacturer and mentioning this item.

Federal Aid Funds For States in 1941

The apportionment of $134,062,500 as Federal Aid for highway improvement and the elimination of hazards at railroad grade crossings, as authorized by the Act of September 5, 1940, has been made by Federal Works Administrator John M. Carmody among the forty-eight states, the District of Columbia, Hawaii and Puerto Rico. The funds are available from appropriations authorized for the fiscal year beginning July 1, 1941, after deductions of amounts authorized for administrative expenses, and are to be expended under the supervision of the Public Roads Administration. Of this total, $100,000,000 is for the improvement of the Federal-Aid system and its extensions through cities, $17,500,000 for improvement of secondary or feeder roads, and $20,000,000 for the elimination of hazards at railroad crossings.

In making the apportionment, Mr. Carmody directed attention to the provision of the act that "the Commissioner of Public Roads may give priority of approval to and expedite the construction of projects that are recommended by the appropriate Federal defense agency as important to the national defense." All states are being urged to use Federal-Aid funds to the fullest extent possible for roads giving access to the numerous new and expanded Army and Navy bases, camp and training areas, and to plants of defense industries.

As heretofore, the highway funds are apportioned among the states in proportion to population, area, and mileage of rural post roads. Grade crossing funds are apportioned, one-half on the basis of population, one-fourth on the basis of mileage of the Federal-Aid system, and one-fourth according to railroad mileage. It is provided that no state shall receive less than one-half of one per cent of the total funds.

Mr. Carmody also announced at the same time the apportionment of $1,500,000 to be expended in the thirteen public-lands states for the construction of roads through public lands and Federal reservations.

The apportionment follows:

State	Regular Federal Aid	Secondary or Feeder Roads	Grade Crossings	Total
Ala.	$ 2,080,245	$ 364,043	$ 406,480	$ 2,850,768
Ariz.	1,435,382	251,192	129,679	1,816,253
Ark.	1,707,928	298,887	336,619	2,343,434
Calif.	3,982,125	696,872	799,099	5,478,096
Colo.	1,798,524	314,742	252,705	2,365,971
Conn.	620,997	108,674	164,330	894,001
Dela.	487,500	85,313	97,500	670,313
Fla.	1,425,748	249,506	299,547	1,974,801
Ga.	2,519,366	440,889	488,535	3,448,790
Idaho	1,235,985	216,297	167,025	1,619,307
Ill.	3,954,419	692,023	1,011,900	5,658,342
Ind.	2,415,900	422,782	501,817	3,340,499
Iowa	2,505,523	438,467	538,808	3,482,798
Kans.	2,539,360	444,388	487,825	3,471,573
Ky.	1,840,894	322,154	357,973	2,521,023
La.	1,467,188	256,758	318,101	2,042,047
Me.	866,500	151,637	133,657	1,151,794
Md.	833,715	145,900	204,759	1,184,374
Mass.	1,311,369	229,489	387,602	1,928,460
Mich.	3,028,316	529,955	651,077	4,209,348
Minn.	2,709,402	474,145	525,569	3,709,116
Miss.	1,773,232	310,314	314,017	2,397,565
Mo.	2,967,206	519,261	580,174	4,066,641
Mont.	2,018,907	353,309	262,484	2,634,700
Nebr.	1,991,356	348,487	335,670	2,675,513
Nev.	1,274,718	223,076	97,500	1,595,294
N. H.	487,500	85,313	97,500	670,313
N. J.	1,274,429	223,025	376,651	1,874,105
N. M.	1,620,981	283,672	170,673	2,075,326
N. Y.	4,824,597	844,394	1,330,049	6,998,950
N. C.	2,378,838	416,297	515,538	3,310,673
N. D.	1,504,377	263,266	300,388	2,068,031
Ohio	3,526,168	617,079	818,286	4,961,533
Okla.	2,271,217	397,463	439,081	3,107,761
Oreg.	1,647,906	288,383	228,715	2,165,004
Penn.	4,095,568	716,724	1,091,120	5,903,412
R. I.	487,500	85,313	97,500	670,313
S. C.	1,341,640	234,787	297,944	1,874,371
S. Dak	1,583,613	277,132	260,078	2,120,823
Tenn.	2,114,507	370,039	381,156	2,865,702
Tex	6,294,440	1,101,527	1,096,857	8,492,824
Utah	1,123,714	196,650	129,466	1,449,830
Vt.	487,500	85,313	97,500	670,313
Va.	1,844,069	322,712	375,157	2,541,938
Wash.	1,580,939	276,664	304,376	2,161,979
W. Va.	1,095,332	191,683	264,524	1,551,539
Wis.	2,406,404	421,121	484,129	3,311,654
Wyo.	1,246,353	218,112	131,610	1,596,075
Hawaii	487,500	85,313	97,500	670,313
D. C.	487,500	85,313	97,500	670,313
P. R.	495,603	86,731	166,250	748,584
TOTAL	$97,500,000	$17,062,500	$19,500,000	$134,062,500

Pumps and Machinery For Dredging Jobs

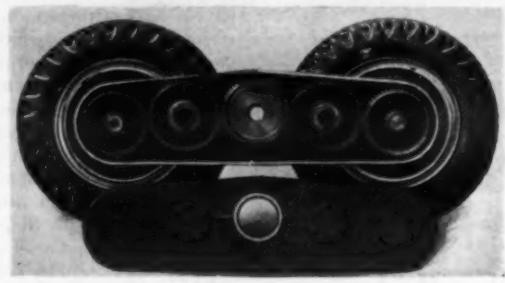
The Lawrence Machine & Pump Corp., 371 Market St., Lawrence, Mass., announced recently the publication of Bulletin 208-2 covering its standard dredging pumps and hydraulic dredge machinery. These pumps are designed primarily for general dredging service, for pumping sand and gravel, ashes and cinders, and for other applications where the pump is required to handle mixtures of water and abrasive solids. The bulletin describes fully the construction of these pumps and includes several photographs of dredges, and tables giving capacities, speeds, and power requirements for different sizes at various heads.

Copies of this bulletin may be obtained direct from the manufacturer by mentioning this magazine.

ALL GEAR DRIVEN

DOUBLE DRIVE

AVAILABLE ON GALION 101–201 MOTOR GRADERS



Here you see the accurately meshing, machine cut and heat treated gears and spindles with roller bearing mounting. Photo below shows the flexibility of Galion double drive. Other features: diesel or gasoline power; full revolving circle; centralized, fingertip controls; etc.

100% anti-friction bearing mounted. No chains to tighten —full flexibility.

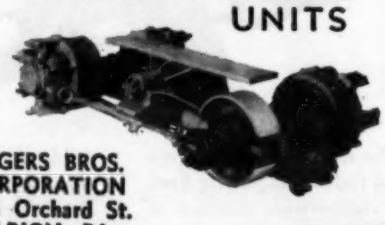
Investigate

THE GALION IRON WORKS & MFG. CO.

Main Office and Works: Galion, Ohio

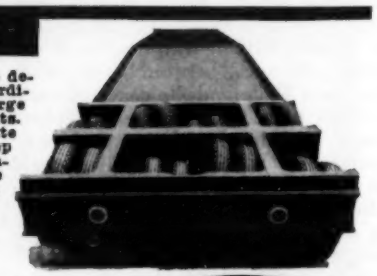
YOU'LL ENJOY EXCEPTIONAL SERVICE

If your trailer rides on two of these ROGERS UNITS



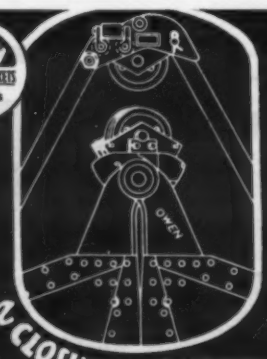
ROGERS BROS. CORPORATION
108 Orchard St.
ALBION, PA.

TRAILER service and tire life depend upon vital parts not ordinarily visible. Under rear of large trailers are two very important units. They must carry the load, oscillate lengthwise and crosswise, and keep all eight wheels in permanent alignment. Rogers have met all of these exacting requirements in the unit illustrated. Note heavy pad supporting one of two wide-flange H sections, the well-ribbed castings, the widely-spaced bearings of rocking members, the large area of brake shoes, the heavy cross-section, non-tapering spindle and the two extra large Timken bearings between which the wheel load is equally distributed.



EXPERIENCE *builds 'em* PERFORMANCE *sells 'em*

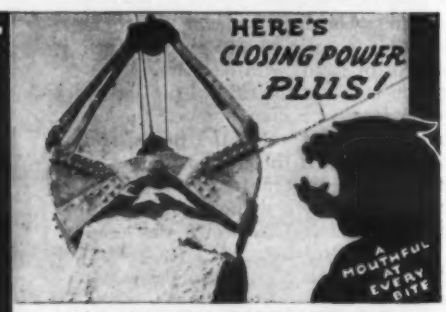
OWEN CLAMSHELL BUCKETS MOVE A BIGGER DAY'S WORK



Extra CLOSING POWER for TOUGH DIGGING

Distinctive DIGGING FACTORS

Tremendous OWEN closing power, converted to digging power assures "A Mouthful at Every Bite." Since the majority of sheave block weight is in the bottom sheave, it directly counteracts the lifting force of the lines and transforms it to balanced, extra digging power.



THE OWEN BUCKET CO.
6030 BREAKWATER AVE., CLEVELAND, O.
BRANCHES: New York, Philadelphia, Chicago, Berkeley, Cal.

Maintaining Machines For State Road Work

(Continued from page 29)

made, it is not repeated on following daily reports. In Section B "Unserviceable Equipment" machines which are laid up and on which repairs are considered impractical, or on which repairs have not been authorized by the inspectors, are listed.

The service order, Form No. PUR-15, is used by the inspector to authorize repairs on equipment which has been reported out of service as unserviceable. This form is used only to authorize the district supervisor to have the work performed in the department's own shop. It is executed in triplicate, the original white copy being signed by the district supervisor after the work is done and returned to Hartford for accounting. The second yellow copy is forwarded to Hartford immediately upon execution and the third blue copy is retained as the district office record of the authority to repair the equipment.

Another form, No. PRO-14, is used for the transfer of equipment from one district to another and contains the request for equipment by one district, the authorization of transfer from another district and three spaces at the bottom of the form to indicate that the transfer has been authorized, the second that the equipment has been released by the first district and the third that it has been actually received by the district to which its transfer was authorized.

Lubrication Schedule

Up to two years ago every machine with an internal combustion engine had the crankcase oil changed every 1,000 miles except for such equipment as was engaged in extremely severe service and then a change was left to the individual operators. Two years ago oil filters were placed on all crankcase lubricating systems and now the machines are run 2,000 miles or more on the same oil and the standard blotter check is used to determine when the oil should be removed from the crankcase and replaced. All motor vehicle equipment is pressure-lubricated after each 1,000 miles of service except equipment used under severe muddy or stormy conditions which might cause the loss of some lubricant by the severe service. Then lubrication is at more frequent intervals. This is left to the judgment of the district supervisor.

Personnel

William J. Cox is Commissioner, Connecticut State Highway Department, with J. E. Vehring, Superintendent of Property Control, and H. S. Sturm, Head Property Examiner, in charge of all state-owned equipment and its maintenance.

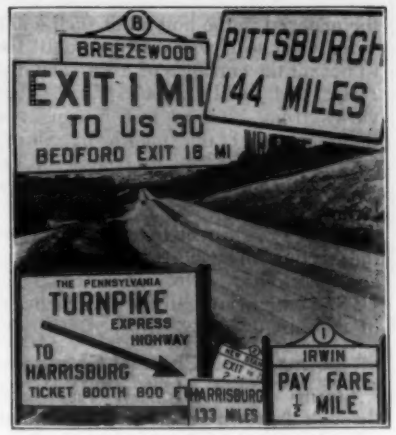
Is your equipment up-to-date? Check up on the 1941 models and write for further details.

Enameled Road Markers Used on the Turnpike

Porcelain enameled signs, a new and modern application of an ancient art, have been selected as road markers on the new Pennsylvania Turnpike, extending 160 miles across the state from Pittsburgh to Harrisburg. Installed over the entire route, these signs distinctly mark the towns, cloverleafs, speed reduction zones, caution and restricted zones, entries and exits from the highways, and the tunnels.

Manufactured by the Porcelain Metal Products Co., Carnegie, Penna., the base metal of these signs is Jones & Laughlin vitreous enameling sheets upon which has been fused at high temperatures a smooth porcelain enamel which will not flake, peel or blister under severe conditions, according to the manufacturer.

The signs used on the Turnpike, some measuring as large as 8 x 12 feet, are equipped with cat's-eye reflectors outlining the words in the sign for night drivers. The curve and warning signs



Some of the signs along the new Pennsylvania Turnpike.

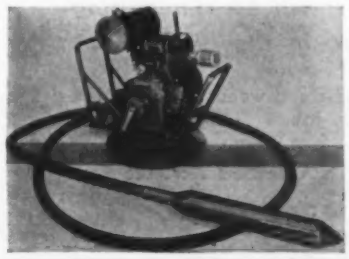
are black on a yellow background, while the directional and marking signs are black on a white background. Mounted on heavy wooden posts or steel brackets, the signs are firmly secured along the road.

Porcelain enamel, an opaque glass composed of minerals having no organic ingredients, offers a complete range of permanent colors of any value or intensity in a variety of finishes, and because of the high attention value attained by the brightness of the glossy finish, has found favor for use as road markers.

Rubber Products Catalog

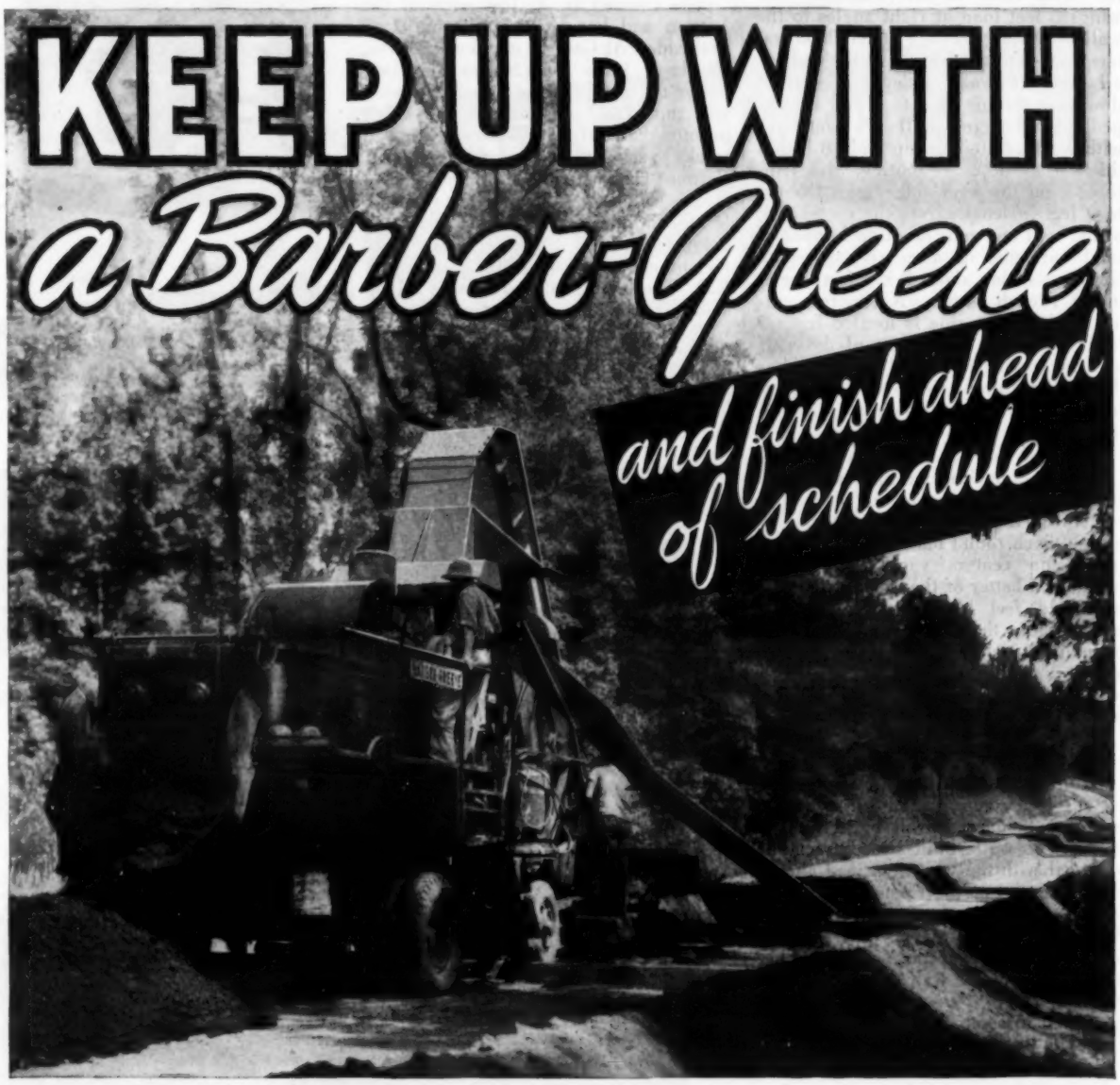
"Hewitt Rubber Products for Industry" is the title of a 36-page catalog recently issued by the Hewitt Rubber Corp., Buffalo, N. Y. Included are such items as air drill hose, pneumatic tool hose, welding and steam hose, water and sand suction, and jetting, hydraulic and grout hose, and others. Each item is described and illustrated, and recommendations for its use are given. At the back of the catalog is a list of the materials that have a serious effect on rubber and a list of materials that do not harm rubber.

Copies of this bulletin may be obtained direct from the manufacturer by mentioning this item.



Concrete VIBRATORS
AND GRINDERS
Write for Circular on types, sizes and prices
White Mfg. Co.
ELKHART INDIANA

KEEP UP WITH a Barber-Greene and finish ahead of schedule



LET a Barber-Greene Mixer set the pace on your next bituminous job.

Here, the Hardaway Construction Company is using a B-G Normal Duty Travel Plant on a 14-mile sand asphalt job in southern Mississippi. Mixing two yards of loose material per minute, this plant is living up to its reputation for speed, economy, and perfection. Operating continuously and consistently, the entire job is functioning smoothly on a stiff production schedule. When this project is finished, the Barber-Greene will be easily moved to the next location ready to handle whatever mix is needed, either in Central or Travel Plant work.

There's no reason for having less than a Barber-Greene. It's available in four sizes, Heavy Duty, Normal Duty, Utility, and the new B-G Maintenance Plant. You should have complete information. Just write. There is no obligation.

40-12

BARBER GREENE
STANDARDIZED MATERIAL HANDLING MACHINES
AURORA ILLINOIS

Flood Control Work At Ironton, Ohio

(*Continued from page 23*)

them by hand in the customary manner, one end of each pipe was belled so that the next length could be pulled into it. This job was not easy as the old sewer was not round but the pipe was finally installed and grouted between it and the old sewer. A 10-inch thick reinforced octagonal lift gate 10 feet high is installed at the center line of the levee so that the pipe may be closed in time of floods. When this happens, drainage will fill the pipe so all of the laterals are gated. The eight laterals entering this sewer are from 10 to 20-inch cast iron pipe.

Concrete Wall Continued

From Gate 4, 844 feet of concrete wall was built with hired labor by the U.S.E.D. The wall runs 20 feet into the earth levee in all instances, with wings 6 feet long at right angles to the wall to prevent seepage of the flood waters back into the levee. At the ends of all concrete walls a levee is carried down on a slope of 3 to 1 and riprapped. The concrete wall is a cantilever with a 1-foot 10-inch cap and 18 inches thick at the top. A footing, also reinforced, on the land side varies from 4 to 9 feet in length from the center line of the wall and ends in a 6-inch layer of sand surrounding a coarse aggregate core, measuring about 2 x 1 feet, forming a French drain. A concrete cutoff on the water side is located from 5 to 11 feet from the center of the wall and the footing itself is 1 foot 4 inches thick of reinforced concrete. The cantilever wall with the footing forms an inverted T.

The wall itself is reinforced horizontally with ½-inch round bars at 11-inch centers on the water side and 24-inch on centers on the land side, and vertically with ¾-inch round bars spaced 1 foot 6 inches on centers varying with the height and batter of the wall. All walls under 14 feet high are straight and walls higher than that are battered ½ inch in 12 inches on the land side and are straight on the water side. The walls built in this project varied from 3 to 24 feet in height.

Levee and Contract-Built Wall

At this point the U.S.E.D. built 2,100 feet of levee ending in the first of the sections of concrete wall built by contract. The walls built by contract are identical with the wall described above, except instead of the French drain with coarse aggregate there is a Republic Steel perforated drainage pipe inserted on the land side of the footing. This section of concrete wall, built by W. H. Mueller Co. of Detroit, Mich., will be described in some detail in a later article. The wall is 3,184 feet in length.

All of the levees were built by hired labor and have a minimum inspection trench along the center line 7 feet deep and 10 feet minimum width at the bottom. The plans originally called for a 6-foot minimum width but no equipment available could be used to roll the material in the bottom of such a narrow trench so it was widened to 10 feet to permit the entrance of a Parsons disk roller and small tractor. The levee varies from 4 to 50 feet in height at the closure of the mouth of Storms Creek and has a 2½ to 1 slope on the land side and a 3 to 1 slope on the water side.

A levee 3,406 feet long extends from the section of concrete wall built by contract to Gate No. 10 which is the U. S. 52 highway gate at the north end of the city.

Storms Creek Channel Change

Storms Creek formerly meandered through the town but now is carried outside the levee at the north end of the town through an open cut channel. The U. S. Engineer Department excavated a portion of the new channel where the city was building a new bridge to take U. S. 52 over the new channel. The city then built the bridge over what was apparently dry land and later, as the work progressed, the new channel was completed.

The channel is 20 feet wide at the bottom and has slopes of 1 on 2 on both sides. At Gate 10 mentioned above, the levee turns away from the river along the new Storms Creek diversion and runs 1,534 feet to Gate 11 which permits the Norfolk & Western Railroad tracks to leave the city at the north end. Between Gates 10 and 11, Pump Station No. 5 is located. Beyond Gate 11 the levee continues along Storms Creek for 2,496 feet where it connects with 2,138 feet of concrete wall built by the U.S. E.D. The levee in this section is a long side-hill fill. The connecting concrete wall on higher ground was only 3 feet high, the freeboard of the levee. The concrete wall crossed an old creek bottom at Seventh Street and reached a

(*Concluded on next page*)

Air-Operated Hoist

In state district garages, county garages and contractors' field shops, air-operated hoists are a great boon when engine blocks and other materials, just too heavy for one man to handle, have to be lifted quickly. Ingersoll Rand Co., 11 Broadway, New York City, has recently announced three sizes of Air-Bloc hoists for handling loads of 300, 500 and 700 pounds respectively. The Air-Bloc is a flexible welded link-chain air hoist weighing less than 75 pounds and can be moved easily from one job to another. An automatic up and down stop control prevents damage to the hoist from overrun of the chain in either direction. Another safety feature prevents the load from dropping if the air supply fails.

An illustrated 4-page folder, Form 2714, will be sent by the manufacturer free on request.

the best CONCRETE BUCKET that money can buy!

. . . an exclusive feature
the discharge gate is a thick rubber pad running on anti-friction roller bearings

BLAW-KNOX CONCRETE BUCKETS, with controllable discharge, are a popular concrete placing unit. They operate easily because the discharge gate is a thick rubber pad running on roller bearings.

Leakproof—they are truly one-man operated. Exclusive features of design put Blaw-Knox Concrete Buckets in a class of their own for easy and quick operation, complete controllable discharge.

Made in all sizes from ¾ to 8 cu. yd. Capacity, for either normal or low slump concrete. Send for catalog 1586.

BLAW-KNOX DIVISION
of Blaw-Knox Company
Farmers Bank Bldg. Pittsburgh, Pa.

Blaw-Knox CONCRETE BUCKETS

BLAW-KNOX BINS AND BATCHERS • ROAD FORMS • STREET FORMS • CONCRETE SPREADERS • TAMPING ROLLERS • VIBRATORS
CONCRETE BUCKETS • CLAMSHELL BUCKETS • TRUCK MIXERS • STRIPING MACHINES • TURNTABLES • ROAD FINISHERS • STEEL FORMS

Spring is just around the corner and soon the blue grass will be shimmering in the sun . . . and the weeping willows will be rustling in the breeze . . .

Will you be ready with your mowing machinery all spruced up and ready to go?

This year we are building the best and most complete line of Mowers in our history. It doesn't make any difference if you have an acre or a thousand miles of grass and weeds . . . there is a Toro Mower for every job.

Write us today for our beautiful 32 page Catalog and 1941 Golfers Calendars . . . they are knockouts!

Minneapolis . . . City of Beautiful Lakes, Homes, Parks, Golf Courses, Championship Football Teams, Pretty Girls and Fine Mowing Machinery.

TORO MANUFACTURING CORPORATION
MOWING MACHINERY SPECIALISTS FOR OVER 20 YEARS
MINNEAPOLIS, MINNESOTA

HEET-MASTER—SAVES 50% ON FUEL

HEATS TAR & ASPHALT TWICE AS FAST.

Send for Bulletin No. 196 FREE on HEET-MASTER Kettles for Contractors

AEROIL BURNER CO., INC.
5775 Park Avenue, West New York, N. J.
Chicago San Francisco Dallas

New Levee and Wall To Protect Ohio City

(*Continued from preceding page*)

maximum height of 10 to 18 feet. Where the wall crossed Seventh Street, the city had a 20-inch sewer which was shifted to connect with Pump Station 5 in the old Storms Creek bed.

At Seventh Street an old creek bottom had been filled in with cinders, ashes, brickbats and rubbish, and had to be excavated to a depth of about 25 feet and backfilled so as to give a good foundation for the high wall. The edges of the backfill were carried up on 1 on 4 slopes and the trench was 50 feet wide at the bottom and about 300 feet long. Parsons disk rollers, giving 105 pounds per square inch compaction, were used in compacting this foundation fill, and the wall was built over it immediately. Subsidence plates were inserted in the fill and no settling has been recorded to date.

Gate 12, a purlin closure, is in the high concrete wall and beyond this, Gates 13 and 14 in a low section of the wall are sand-bag closures.

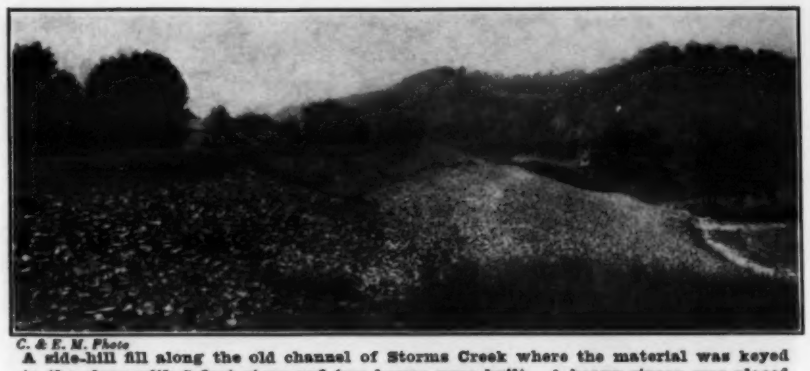
The wall ends in a 916-foot levee which contains Gate 15 on the Detroit, Toledo & Ironton Railroad and a small high levee 345 feet long carries the levee to connect with high ground and completes the defense of the main section of Ironton against future flooding. Pump House No. 6 is located between Gates 14 and 15.

Handling Pipes Outside of Levees

All water and gas line and other utility pipes used to connect manufacturing plants located outside of the levees with the utilities inside were broken 10 feet outside the toes of the levee and carried up on the same slope as the levee with 1½ feet of cover.

A Typical Gate Closure

Gate No. 1 has a typical truss closure and is shown in one of the accompanying illustrations. Two steel trusses are mounted in the center of the road, bearing on sills which are concrete beams acting as cut-offs 10 feet deep. Five H-beams are then set in the slots cast in the concrete abutments of the gate and vertical-sloping 2 x 8 planks are laid against the H-beam purlins, covered with heavy roofing paper and then horizontal planks are laid across and wedged tight in the slots in the abutments against the roofing paper, making a remarkably watertight closure.



C. & E. M. Photo

A side-hill fill along the old channel of Storms Creek where the material was keyed to the slope with 5-foot steps and two berms were built. A heavy riprap was placed on the toe as additional protection against slides.

Personnel

The Ironton, Ohio, flood protection project has been built under the direction of the Cincinnati Office, U.S.E.D., Major F. T. Bass, District Engineer, with J. K. Smith as Resident Engineer. The contractor for the six pump stations was Norton & Nadalin of Columbus, Ohio, with J. Nadalin as Superintendent; and W. H. Mueller Co. of Detroit, Mich., was the contractor for the sections of concrete flood wall not built by hired labor, with Flore Nevejans as Superintendent.

Heavy-Duty Trailers Purchased for Army

Fifty-one 16-ton trailers are now being built for the U. S. Army Engineer Corps by the La Crosse Trailer & Equipment Co., La Crosse, Wis. Designed for army use, these trailers are constructed for operation over rough terrain, with the load platform comparatively high above the ground to allow greater wheel clearance. All six wheels are equipped with air brakes.

These trailers are similar in general specifications to the standard La Crosse Model DF, except for their higher wheel clearance and shorter length which is 12 feet 6 inches. A similar lot of 20 trailers of this type, with slightly longer platforms, are also being built by the La Crosse Trailer & Equipment Co. for the Commonwealth of Pennsylvania.

CUMMER
ASPHALT
PLANTS

Portable Combination Hot and Cold Mix Plants

Portable Hot Mix Plants

Stationary Combination Hot and Cold Mix Plants

Cummer Combination Dryer-Coolers.

Steam Jacketed Mixers 400 to 8000 pounds capacity.

Cummer Internal Fire Dryers

Electric Batch Timers

THE F. D. CUMMER & SON CO.

Euclid and 17th, Cleveland, Ohio

HYATT WOUND ROLLER TYPE AND HY-LOAD SOLID ROLLER BEARINGS shown here. Inherent design advantages, uniformity and accuracy, along with their capacity for heavy loads, account for the wide-spread application of these better bearings.

KEEP THEM YOUNG WITH HYATTS

BECAUSE OF FRICTION-FREE HYATTS at vital operating positions, very little attention is required by the shovels, tractors, scrapers, mixers, rollers, etc., that handle the work around busy construction and road jobs. With Hyatts carrying the loads, production is speeded up, and bearing wear and care eliminated. To keep your equipment on the go, always, be sure Hyatts are there when *you* next build or buy. Hyatt Bearings Division, General Motors Sales Corporation, Harrison, New Jersey; Chicago, Pittsburgh, Detroit and San Francisco.

HYATT
ROLLER BEARINGS
QUIET

Fast Rock Moving In Heavy Deep Cuts

(*Continued from page 2*)

vertical face, operated for about 1,000 feet in a cut between Sta. 60 and Sta. 70, loading at first to six 13-yard Euclid Trac-Truks. Later two of these were sent away to another job and replaced with two 9-yard rented Trac-Truks. This cut was shot down, using 40 per cent gelatin dynamite. The material through this cut was a disintegrated shale similar to the type that existed throughout the length of the job.

This material went out to two fills totaling 42,000 yards and the balance was wasted. The shovel loaded the 13-yard Trac-Truks at intervals of 1½ minutes each, keeping the fleet of six moving rapidly, and at that the shovel had time to spare in spite of the fact that the haul was not more than 1,800 feet one way.

A 1,000-Foot Fill

The biggest volume of fill on the job went in between Stas. 70 and 80 where 119,177 cubic yards of fill, 75 feet high with a 36-inch oval strutted corrugated-metal bituminous-coated culvert pipe 322 feet long, furnished by the U. S. Fabricating Co., was first placed. The start of this fill was very interesting as the grades were practically impossible for the Trac-Truks to negotiate. As shown in the photo on page 2, a long sidehill cut, indicated by the rounded section in the middle of the cut in the background, was made with a bulldozer which then broke down the beginning of the large cut at the right so that the empty 13-yard scrapers could go up through the cut at the right, get their load at the top of the hill and then return through the narrow notch at the left, dragging the pans as brakes. The knob between these two cuts, as seen in the illustration, is 1 foot below finished grade. This procedure was necessary because the contractor did not feel he was warranted in paying the sum required by the farmer to secure a temporary easement through the orchard at the extreme right which would have permitted a much lower grade for moving the empty scrapers to the top of the hill. A fleet of five LeTourneau 13-yard Carryall scrapers, pulled by D8 tractors, worked in this cut and two D8 tractors with LeTourneau bulldozers spread the material on the fill.

Rock went into all fills in 12-inch layers and earth in 4-inch layers, being compacted by rolling with Buffalo-Springfield 10-ton 3-wheel rollers. The character of the rock and earth was such that great care had to be taken in operating the roller at the edge of fills as a number of times it started to slide off the edge and had to be pulled back on by one of the tractors. One did go over a 20-foot fill, but two bulldozers went to the rescue and had the roller back on the fill in operation in an hour and a half.

Cut Widened for Borrow

Between Stas. 80 and 90 the plans called for a 10,956-yard cut but the contractor took out 55,000 cubic yards by securing borrow at the top of the cut by widening it to make part of the big fill. This was done rather than make the long haul from the west end of the job and saved the contractor considerable time. Material at the west end was wasted in the plaza mentioned. During the first 41 working days charged to grading by the inspector, 41 per cent of the grading was completed.

This work was all done with part of the fleet of LeTourneau 13-yard scrapers which moved 300 loads in 7 hours on one of the night shifts. The entire job was operated to average moving 10,000 yards of material each 24 hours.

C. & E. M. Photo

Myers ran his I-R wagon drill with a compressor mounted on a diesel Seventy-Five.

Between Sta. 90 and Sta. 100, at the end of the job, was a 15,747-cubic yard fill.

Drilling and Blasting

For handling the drilling on the job the contractor installed an Ingersoll-Rand 360-cubic foot compressor on the rear of a Caterpillar Seventy-Five tractor, driving the compressor with a V-belt from the power take-off of the tractor. Air from this outfit was used to operate an Ingersoll-Rand wagon drill, using steel with Timken detachable bits for 12-foot maximum-depth holes. Hercules and Austin Red Diamond dynamite was used, fired by a Victor hand-operated blasting machine.

Major Quantities

The major quantities involved in this contract include:

Class 1 excavation, rock and earth moved by machinery	410,345	cubic yards
Class 2, hand excavation	1,268	" "
Shaping subgrade for paving	39,949	square "
Building shoulders	11,140	linear feet
Reinforced-concrete paving	38,321	square yards
15-inch cast-iron pipe	238	feet
18-inch cast-iron pipe	1,246	"
24-inch cast-iron pipe	84	"
18-inch interlocking-joint cast-iron pipe	380	"
24-inch interlocking-joint cast-iron pipe	120	"
30-inch corrugated-metal pipe, plain	78	"
15-inch asphalt-coated corrugated-metal pipe	30	"
18-inch asphalt-coated corrugated-metal pipe	154	"
24-inch asphalt-coated corrugated-metal pipe	142	"
36-inch 8-gage asphalt-coated corrugated-metal pipe	322	"
36-inch 10-gage asphalt-coated corrugated-metal pipe	222	"
48-inch reinforced-concrete pipe	175	"
15-inch vitrified-clay pipe for storm sewer	234	"
18-inch vitrified-clay pipe for storm sewer	76	"
4-inch vitrified-clay perforated tile underdrain*	10,638	"
4-inch vitrified-clay perforated tile underdrain**	560	"
Guard fence	2,128	"
Guard fence	4,080	"

*This perforated underdrain tile is used in the benches on side-hill fills and in cuts adjacent to the roadway in the shoulders.

**This perforated tile is used under the concrete gutter for subgrade drainage where spring conditions were found.

Miscellaneous Items

Pennsylvania Department of Highways specifications require all slopes on fills to be made 1½ to 1 and in cuts 1 to 1 rounded at the top. The procedure for cuts 15 feet or less in depth is to go out horizontally from the top of the normal 1 to 1 slope for 5 feet and then down the slope for 5 feet, on the plans; connect these two points with a straight line; and then run a vertical down from the intersection of the top and slope, dividing this by 2 to get the mid point for the grade of the rounded slope. On cuts greater than 15 feet deep the points are set 8 feet down the slope and 8 feet back from the intersection on top.

On this contract it was necessary to move eleven small houses, barns and sheds and to demolish thirteen houses which were rebuilt elsewhere.

A contract in Pennsylvania now includes a graph, indicating the number of days estimated to be necessary for the various operations on the job and showing the overlap of the different operations. On this particular contract 5 days was indicated for assembling the grading equipment, a total of 113 days from the fifth day of the contract to the 118th day for grading, then a slight overlap allowing 34 days for the reinforced concrete pavement operation and an overlap with a total of 50 days for the clean-up, including shoulder operations and ditches.

Personnel

The contract for 2.09 miles of 33-foot reinforced-concrete paving on new grade was awarded to Ralph Myers Construction Co., Salem, Indiana, on its low bid of $252,596.78. R. Paul Mauger, Engineer for the contractor, acted as Superintendent on this job and Owen King was Project Engineer for the Pennsylvania Department of Highways. The pouring of the concrete slab was subcontracted to Shullo Construction Co., Akron, Ohio.

Water and Damp-Proofing

Four folders have recently been issued by Koppers Co., Tar & Chemical Div., Pittsburgh, Penna., describing waterproofing and damp-proofing of concrete and brick foundations, precast concrete piles or slabs, and for water works and sewage disposal plants.

Form TB-3 tells when waterproofing and damp-proofing should be applied. The respective values of fabric and felt are described and methods of application are pictured and discussed. Form TB-4 distinguishes between damp-proofing and waterproofing, tells when each should be used and describes how to damp-proof poured concrete, concrete piles or slabs, floors and subfloors of superstructures. Form TB-5 discusses circumstances under which these treatments are necessary and provides a table of recommended applications for pipe galleries, foundations, sumps, clear water wells, dams, pits, reservoirs, tunnels, covered storage tanks, pipe and precast concrete. Form TB-2 gives instructions for water and damp-proofing aeration, sedimentation and grit chambers, drying beds, pipe galleries and control rooms, concrete sewage pipe and foundations and describes the value of these applications.

Copies of these folders may be obtained by those interested direct from the manufacturer.

Get the Most Out of Men and Tractors, *with*—

"R. C. GROUNDHOG"

REVOLVING TRACTOR SCRAPER

For fast and economical moving of dirt nothing can cope with the "Groundhog." It is easy on tractor and operator—no stopping or backing. Quickly and easily changed from full automatic loading to semi-automatic loading or rope control. Simple design; rigid construction; few moving parts. Two sizes: 3/5 yd. for a 4-ft. cut; 3/4 yd. for a 5-ft. cut. Write today for literature and prices.

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WILL NOT FOUL
ELIMINATE SPLICING

OUTPULL ANY ROPE
SIZES ⅛" TO ¾"

and SAFE-LINE WIRE ROPE CLAMPS mean you will protect your employees' lives and save money by eliminating costly delays due to the biting action of old style clamps, causing the wire rope to break far below its actual strength. Insure against loss of equipment by STANDARDIZING on SAFE-LINE today. Made to fit all right lay ropes.

NATIONAL PRODUCTION COMPANY
4571 ST. JEAN • DETROIT, MICH.

SAFE SECURE SIMPLE
Safe-Line
WIRE ROPE CLAMP

Hose for Suction Or Discharge Service

The B. F. Goodrich Co., Akron, Ohio, has recently issued a new 4-page catalog section on its line of suction hose. The leaflet describes the Spiralock construction developed by this company which provides a smooth-bore hose, for either suction or discharge service, that is light in weight and easy to bend. The patented process locks the fabric around the spiral wire, thus holding the wire firmly in position so that it can be pounded back into place without serious damage should the hose be crushed accidentally. The leaflet also describes the construction of all types of suction hose, giving approximate data on the different sizes, net weight pounds per foot, standard length of blank ends and overall outside dimension.

Copies of this catalog section may be obtained direct from the manufacturer by mentioning this item.

Road-Building Machinery

The Gledhill Road Machinery Co., Galion, Ohio, has available a general catalog containing illustrations and complete data on its line of road-building equipment. This includes a road roller that can be converted into a rubber-tired tractor, a Road Shaper for shaping and maintaining road surfaces of bladable material, a No. 7 double planer, a No. 7 V-shaped road builder, snow plows, highway mowers, and the Gledhill batch box. Construction features and specifications are given on each piece of equipment.

Copies of this Bulletin 75 may be obtained direct from the manufacturer by mentioning this item.

Concrete Spreader Catalog

The Jaeger Machine Co., 701 Dublin Ave., Columbus, Ohio, states that its re-mixing concrete spreader re-mixes, spreads, strikes off up to 100 cubic yards an hour, eliminates segregation, cuts spreading and finishing costs and increases paver and finisher capacity. Paragraphs describing and illustrating each one of its features are contained in Bulletin CS-40, recently issued by this company, copies of which may be obtained by writing direct to the manufacturer.

National Defense jobs that can be done *better, faster at low cost* with STANDARD OIL ASPHALT

● Some few county and state highway officials may be directly concerned with National Defense highway plans. There is a very good reason why all highway officials should concern themselves with these plans.

The greater percentage of defense funds must be spent for equipment and projects of military value only. But projects such as widening highways and bridges, improving secondary road systems and building airports, which are classed as defense measures, are equally important to your community for normal peace-time needs.

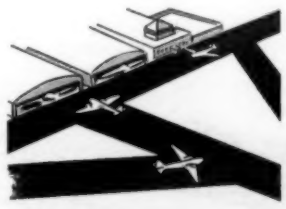
Right now speed and low cost are of utmost importance. If you have any part in carrying out these National Defense projects, consider these advantages of Standard Oil Asphalt.

HIGHWAY WIDENING

As an emergency measure, highway widening will provide adequate capacity wherever traffic flow is increased by defense activity without the delay and expense of constructing new roads which may or may not be required in normal times.

Asphalt construction offers the fastest and simplest method of increasing highway capacity by widening. Not only can it use local aggregates, but Asphalt can be laid with little interference to traffic.

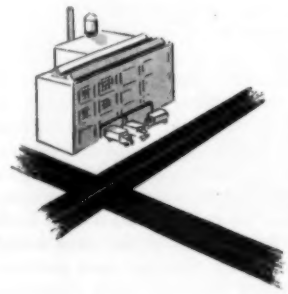
AIRPORT RUNWAYS



Adequate landing fields are urgently needed. Safe, all-weather Asphalt runways can be laid quickly. In most instances local materials can be used, which further speeds up the work and reduces the cost of Asphalt construction.

Airports built now for training and other defense measures will also be an asset to your community after they are no longer needed for defense.

SECONDARY ROADS

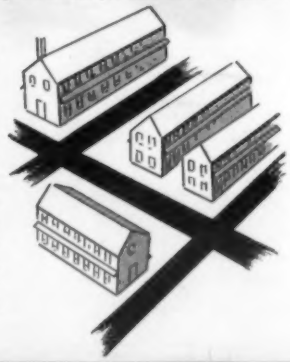


Many miles of secondary roads will become of primary importance for moving manufacturers' products from plant to plant or plant to consumer and in bringing food and supplies from farmers to processors or consumers.

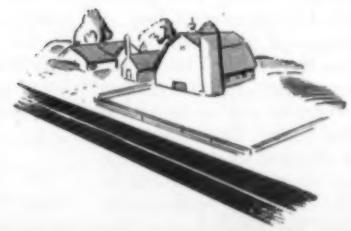
These roads must be passable at all seasons. Time and expense can be saved by using Asphalt construction to build up these "farm to market" or secondary road systems.

CANTONMENT STREETS

Various low-cost types of Asphalt construction are ideally suited for cantonment streets where an improved all-weather surface is needed. Asphalt can be easily maintained for as long as it is needed, and can be abandoned at any time without a great investment loss.



Wherever Standard Oil Asphalt products are sold, there is an Asphalt Representative who can give you full information about these and other uses of Asphalt. Write Standard Oil (Indiana), 910 South Michigan Avenue, Chicago, Illinois.



Asphalt for every purpose STANDARD OIL COMPANY (INDIANA)

C. & E. M. Photo
An expansion joint assembly with ¾-inch cork expansion material in place.

Paving New Lanes For Delaware Route

(*Continued from page 7*)

Fast Clean Batching

It is not frequently that an editor visiting a bulk cement operation is able truthfully to say that there was practically no wastage of cement as this material is exceedingly difficult to handle, flowing like water and responding to every breeze. The manner in which the bulk cement was handled on this job reduced losses to what seems to be an irreducible minimum, considering the economics of handling the material. All of the fleet of five to seven 2-batch trucks were equipped with Stevens Metal Products Co. Turn-O-Matic bulk-cement boxes to which the rubber tube from the weigh box of the Heltzel bulk-cement plant delivered the cement. As soon as the boxes were filled and the truck moved out from under the batching plant the covers were placed on the containers, reducing spillage during hauling. The bulk cement was delivered in standard steel cement cars with hopper bottoms, transferred to the spiral conveyor of the Heltzel plant and then raised by a bucket elevator to the overhead hopper. A Waukesha engine provided the power for this work and an Ingersoll-Rand compressor supplied the air to fluff the cement in the bin. The plant was equipped with Kron dial scales. An RD4 tractor was used to move the bulk-cement cars on the Pennsylvania Railroad siding.

The batching plant was located on a siding near the center of the job where the gondola cars of the two sizes of stone aggregate could be spotted. They were unloaded by an Osgood crane with a 1-yard Hayward bucket which ran between the cars and the Heltzel portable batching plant. Sand was trucked in and stockpiled adjacent to one of the stone stockpiles, with a heavy bulkhead between and with the ground planked to prevent mixture of sand with earth.

The batch trucks arriving empty at the plant were stocked while the driver locked the Turn-O-Matic cement box in a vertical position and placed the cover on tightly. Then they backed under the Heltzel batching plant as the proper batches were weighed out as indicated on the Kron dial scale. Then the truck pulled out, was stopped while the driver opened the tops of the cement containers and then drove to the bulk-cement plant to complete the batch load. One man was kept in the aggregate cars cleaning up to speed the unloading.

The batch weights for this contract were 1,241 pounds of 2-inch stone, 1,241 pounds of 1½ to ¾-inch stone, 1,363 pounds of sand and 621 pounds of cement.

Expansion and Dummy Joints

On this contract the expansion joints were placed 70 feet apart with a single dummy joint in the 35-foot intermediate position. The steel assembly is the same for both types of joints, consisting of eleven ¾-inch round dowels 14 inches long and protruding 6 inches on one side and 8 inches on the other side of the joint. The longer portion of the dowel was painted and oiled and an expansion nipple placed on the end. The dowels are supported by 1 x 1-inch angles welded to each dowel at the top and to a 1¼ x 1-inch angle running the full length of the joint at the bottom. At the top all of the dowels are tied together with a ⅜-inch round deformed rod which is welded to each dowel. This assembly supports the dowels 5 inches from the bottom of the slab. To further stabilize the joint, four plates were welded to the bottom, extending 6 inches either side of the center of the expansion joint material and with holes so they could be held firmly to the subgrade by large spikes or bent rods. Six light welded tips on the bottom angle were bent up to hold the ¾-inch cork expansion material which is 8½ inches high and punched to receive the eleven dowels. The bottom of the expansion material was notched to fit over the bottom supporting plate. The expansion joint was assembled with a 2-inch equal-leg oiled cap and held in place by three vertical pins on the side toward the paver and three sloping pins on the side away from the paver, driven just below the cap so that they would brace the joints and the screed of the finishing machine would pass over them.

As mentioned before, the steel assembly for the contraction joints is identical with that of the expansion joints but they were installed with no cap on the end for expansion joint material. Two men attended to the placing of the various joints and one of them was responsible for the oiling of the forms which was done by applying the oil with a large paint brush.

Speed at the Paver

The organization of the paving crew permitted very rapid work so that when a single paver was used the 9-inch x 11-foot slab was extended 1,400 feet in 11 hours. During the time when two pavers were used the contractor regularly maintained a speed of more than 2,300 feet in 10½ hours. No time was wasted in unloading the batches into the skip of the Koehring 27-E paver where they were mixed for 90 seconds. The man who dumped the batches tripped the latches on the bulk-cement containers and turned back the covers before the batches were dumped. Three pit men worked ahead of the Jaeger-Lakewood double-screed finisher which was set on the first pass to strike off the concrete 2½ inches below the top to receive the welded fabric reinforcing. An advance of about 50 feet was made in this manner and then the entire outfit moved back while the fabric reinforcing was being placed, and then the top was poured. The contractor kept one man shoveling the concrete which dropped from the paver bucket onto a pan, putting it back in the mix, and another man was kept busy sweeping against the second screed on the slab while a third man used a concrete spade to keep the grout from running over the forms at the second screed on the second path of the finisher.

Portable Water Supply

To avoid the necessity of laying pipe along the shoulder and carrying the paver hose across a heavy traffic boulevard, the contractor installed a Barnes pump with a Waukesha engine and a 2-inch 3-stage centrifugal driven by a LeRoi engine to pump water from a creek into two 575-gallon tanks mounted on a GMC truck. This truck shuttled between the pumps and the paver, connecting up at the paver with a 1,000-gallon tank mounted on a 4-wheel trailer which also carried a 3-inch Jaeger Sure-Prime pump delivering the water from the trailer tank to the paver batch tank. As the tanks on the truck were mounted at a slightly higher elevation they emptied by gravity into the trailer tank and as soon as it was empty the trucks uncoupled and drove back to the pumps for refilling. For night work the truck was equipped with a sprinkler connection so that it could run up the subgrade and sprinkle the burlap which had to be maintained wet for 24 hours after it was spread over the finished concrete.

(*Concluded on next page*)

C. & E. M. Photo
The water convoy serving the paver eliminated the long pipe line on the shoulder.

ROSCO BITUMINOUS MATERIAL DISTRIBUTOR

Original 4 Section folding spray bar with high lift and full lateral shift. Circulates full length whether horizontal or folded. Improved control of correct delivery of material through spray nozzles.

SIMPLE - ACCURATE - EFFICIENT - NO GUESSING

ROSCO MINNEAPOLIS

the only 7-way valve with 7 distinct operating functions

7 WAY VALVE

for complete information write

ROSCO MFG. CO., 3128 Snelling Ave., Mpls., Minn.

They pay for themselves in savings
BLAW-KNOX
BULK CEMENT PLANTS
ave everything"
SHIPPED IMMEDIATELY FROM STOCK
A complete job ready to go to work. They include:
• Cement storage bins in a complete range of capacities, both portable and knockdown type, including steel roof for the storage bin.
• Weighing batchers for cement, of any size required, equipped with either beam scales or springless dial scales—manual or automatic types.
• Conveying equipment for elevating cement into storage bins with necessary unloading equipment for receiving cement in hopper bottom cars, box cars, or from truck delivery.
• Power unit and drive for conveying equipment, either gasoline or electric.
Interesting Blaw-Knox Bulk Cement Plants are fully described in Catalog No. 1906. Write for a copy.
AND ACCURATE BATCHERS
BLAW-KNOX
BLAW-KNOX DIVISION of Blaw-Knox Co.
FARMERS BANK BLDG. PITTSBURGH, PA.
BLAW-KNOX BINS AND BATCHERS • ROAD FORMS • STREET FORMS • CONCRETE SPREADERS • TAMPING ROLLERS • VIBRATORS
CONCRETE BUCKETS • CLAMSHELL BUCKETS • TRUCK MIXERS • STRIPING MACHINES • TURNTABLES • ROAD FINISHERS • STEEL FORMS

C. & E. M. Photo
This contraction joint assembly shows clearly the four plates welded to the bottom to hold it vertical.

Delaware Highway Widened to 4 Lanes

(Continued from preceding page)

On this job the concrete appeared as dry as on most paving contracts using a restricted water cement ratio. However, after the finisher had worked over the concrete it showed a considerable accumulation of grout caused by the addition of calcium chloride to the mixing water. Two 30-gallon oil drums were mounted on the paver deck on the opposite side from the operator and filled with 26 gallons of water to which two 100-pound bags of calcium chloride were added. The man who attended to making up these solutions emptied 9 quarts of the solution into the water for each batch of concrete.

The contractor maintained two flat-bed service trucks in operation throughout the work for handling the reinforcing mats, expansion joints and for hauling forms. In addition a lubrication truck made regular visits to the equipment for greasing.

Finishing and Curing

The hand-finishing behind the Jaeger-Lakewood finishing machine was done by five men who used two 10-foot wood drag straight-edges and two 4-foot long-handled floats. The remaining three men worked on edging the slab, with one cutting the joints and applying the broom finish. Behind them, two men spread the burlap, after it had been wet, across the pavement from a carrying bridge and the burlap remained on the slab for 24 hours.

Personnel

The contract for the 22-foot concrete lane on the Gov. Printz Boulevard, between Edgemoor and Hollyoak, a distance of 2.557 miles, was awarded to George & Lynch of Dover, Delaware. For the contractor, Joseph Pennington was superintendent, with C. C. Reynolds, as Division Engineer for the Delaware State Highway Department. Harvey White was Inspector in charge of this project.

Electrode Selector Chart

To simplify the selection of the proper electrode for the job at hand, Air Reduction, 60 East 42nd St., New York City, has announced the publication of an Electrode Selector Chart for use by arc welding operators. Under separate guides, listed according to the metal to be welded, the chart enumerates such things as the suggested type of electrode, welding procedure and recommended voltage and current values. It is attractively designed and is bound so that it can be hung either on the welding machine itself or on a wall within easy reach of the operator.

Copies of this chart may be obtained without charge direct from Air Reduction by mentioning this magazine.

Witherow Appointed N.A.M. Defense Head

William Porter Witherow, President of the Blaw-Knox Co., Pittsburgh, Penna., manufacturer of steel products and construction equipment, has accepted the 1941 chairmanship of the Committee on National Defense and Industrial Mobilization of the National Association of Manufacturers. This committee, which is to be expanded immediately, will consider virtually every aspect of defense activity and a special group is to be designated to act as a liaison between government agencies involved and still another will deal with proposed legislation on national defense as relating to industry.

In accepting the chairmanship of the committee, Mr. Witherow stated, "We recognize that our national defense preparations are only one part of a two-fold program that includes the bulwarking of both our physical and spiritual defenses so that America will be strong enough to face the present world crisis with confidence.

"However, we in the National Defense and Industrial Mobilization Committee can be of greatest service by devoting ourselves to the problem of creating material safeguards for the United States. We must apply ourselves to the physical problem of expediting means of constructing tanks, guns and planes in view of the 'urgency' of this job as emphasized by Defense Commissioner Knudsen."

Diamond-Impregnated Core Bits for Drilling

At the 1940 annual meeting of the American Institute of Mining and Metallurgical Engineers, W. C. Weslow, Engineer, Carboloy Co., Inc., Detroit, Mich., presented a paper "Use of Diamond-Impregnated Cemented Carbide for Core Bits." In the summary of this paper Mr. Weslow brings out the interesting information that laboratory and field work so far has indicated the following:

1. Tungsten carbide and cobalt form the most desirable known matrix material for holding diamonds for drilling.
2. Industrial bort diamonds in sizes and of a class not generally heretofore acceptable and therefore less expensive can be successfully held in this cemented carbide matrix.
3. In exploratory drilling, the combination of bort diamonds, impregnated throughout a matrix of tungsten carbide and cobalt, when fabricated on to drilling crowns, is an indicated economic substitute for drilling crowns in which the diamonds are set by hand, mechanically or by casting.
4. This impregnated type of drilling crown or bit has definite possibilities of revolutionizing the drilling of blast holes, particularly in the harder formations. This will be brought about by the development of high-speed lightweight rotary equipment using an impregnated diamond bit to replace the percussion drill now in general use. (The development of this rotary equipment is well past the laboratory stage at this time.)
5. That the use of a rotary bit is a preventive measure against silicosis.

State highway department engineers and contractors who are especially interested in core bits will do well to read this paper in full in *Mining Technology* for March, 1940. Any further specific information desired may be secured direct from Carboloy Co., Inc., Detroit, Mich., by mentioning this item.

STERLING BALANCED WHEELBARROWS

All trays have double thickness at corners. Both laps are crimped over a continuous butt-welded reinforcing rod.

NO. S-12—FOR DRY MATERIALS WITH PNEUMATIC TIRE WHEEL

NO. S-18—FOR CONCRETE

A COMPLETE LINE OF STERLING WHEELBARROWS AND CONCRETE CARTS

STERLING WHEELBARROW CO., MILWAUKEE, WIS.

BRIDGE REPLACEMENTS WITH —

GOHI PIPE CORRUGATED

Even the most casual observation reveals the fact that more and more large diameter GOHI Pipe is being used to replace small bridges. Lower in first cost, quickly and easily installed, long-lived, trouble-free, wear-, weather- and corrosion-resisting, GOHI Pipe is the logical modern drainage structure designed to give maximum protection to all types of roads, from the country lane to the high-speed trunk highway. Road building dollars go farther when you use GOHI Corrugated Pipe.

New England Bolt Co. . . . . Everett, Mass.
Central Culvert Co. . . . . Ottumwa, Iowa
Capital City Culvert Co. . . . . Madison, Wis.
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Denver Steel & Iron Works Co. . . . Denver, Colo.
The Lane Pipe Corporation . . . . . Bath, N. Y.
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GOHI CULVERT MANUFACTURERS, INC., NEWPORT, KY.

The Pioneer traveling grizzly feeder.

New Grizzly Feeder For Truck Mounting

In crushing plants, production is frequently limited because of delays in feeding the primary crushing unit. Rocks will bridge over and won't go into the crusher, long rocks go in sideways and must be straightened by hand, or a truckload dumped at once causes a surge, delaying the crushing operation, while shortly thereafter the crusher runs empty because there is no regularity of feed.

The new Pioneer traveling grizzly feed for primary crushers is designed to control the feed of material, eliminate choking, handle big rocks, by-pass the undersize, and prevent bridging. Small materials fall between the bars and don't pack the crusher. Bridging is eliminated as the bars keep the rocks moving. Long rocks fall lengthwise onto the bars and are fed one end first into the crusher. If a rock is too large, the feeder—not the crusher—is stopped, the rock broken up, and the feeder started again with no delay in crushing. The maximum speed of this feeder is 30 feet a minute. This is faster than required for constant operation, but allows for the feeder to be stopped for oversize rock, without delaying the crushing operation.

For portable plants the feeder can be mounted on a Pioneer all-steel truck along with the crusher and power plant. A channel frame conveyor is built into the same truck to deliver the materials from the by-pass hopper and crusher to the receiving hopper on the main belt conveyor. The feeder is driven from the crusher by a chain to a clutch shaft, and is controlled by a heavy-duty tandem-disc clutch.

For a stationary set-up, the crusher, traveling grizzly feeder and power unit can be mounted on a base frame with steel or heavy timber. A by-pass hopper is constructed under the feeder to deliver small materials onto the belt conveyor along with the crusher product.

The Pioneer Engineering Works, 1515 Central Ave., Minneapolis, Minn., has recently issued Bulletin No. 536 describing and illustrating this new traveling grizzly feeder and will be glad to send copies upon request.

A Steel Guard Rail To Protect Vehicles

To properly serve as a contributor to the safety of a highway a guard rail must have high overall tensile strength to withstand, without failure, the impact of a motor vehicle and have quick deflective ability to gently guide the vehicle along the traveled roadway.

The Empire guard rail, made by the Empire Plow Co., General Wheelbarrow Co. Div., Cleveland, Ohio, consists of strips of spring steel not less than 12 inches wide and having a minimum tensile strength of 135,000 pounds per square inch. These are attached to posts at 16-foot intervals by cylindrical post springs 12 inches deep and 5 to 8 inches in diameter. The strips are spliced with 9/16-inch chrome nickel galvanized bolts by a simple lap joint and the springs are attached to the post by two ⅝-inch bolts spaced 8 inches apart or a ¾-inch bolt at the center of the spring.

The end spring assemblies consist of two compression springs having a compression travel of 4 inches and together a screw pressure resistance of 10,000 pounds. Full specifications of the Empire guard rail will be found in a green-bordered illustrated folder which will be sent free on request.

New Asphalt Kettles Have Improvements

Widespread use of portable kettles for heating asphalt, road oil and tar, for repairing bituminous highways and for filling cracks or covering broken spots in concrete surfaces, has resulted in numerous improvements in this class of equipment. White Mfg. Co., Elkhart, Ind., has extended its line of kettles and included several innovations in its new models. Emphasis is placed on the fire-proof top of the new kettles, designed to combat the serious fire hazard in heating inflammable material.

White kettles are made with a top fully welded to the kettle instead of the conventional hinged hatchways. Entrance to the kettle is through a 16-inch diameter manhole with the lid held by a simple clamping device. An automatic overflow at the rear of the kettle permits the exit of gases or foaming material as far away as possible from the oil burners.

These kettles are offered in capacities of 65, 110, 165, 220 and 300 gallons. All are equipped with oil burners, with double heat circulation and stack exhaust. The fenders have asbestos insulation to protect the tires and semi-elliptic springs and pneumatic tires give easy riding when the kettles are towed at any reasonable speed.

Spray pumps, either operated by hand or by a gasoline engine, are usually attached and are placed on the rear of the kettles for complete accessibility. Either flexible metal or rubber steam hose carries the hot material to a spray bar with an insulated handle. A barrel hoist, thermometer, warming hood for an additional barrel and dual tires are accessories which can be furnished.

One of the new White portable asphalt-heating kettles.

Complete information on these kettles may be secured by those interested direct from the manufacturer.

The new V-type, 4 cylinder Wisconsin heavy-duty air-cooled engine packs a terrific power wallop per pound of engine weight . . . more so than any other *heavy duty* engine of comparable weight or cubic cylinder capacity.

Make us prove this statement . . . under your own conditions. Detailed data on request. Write Dept. F-2.

MOST POWER PER POUND
HEAVY-DUTY AIR-COOLED ENGINES

by WISCONSIN MOTOR CORPORATION
Milwaukee, Wisconsin, U. S. A.

World's Largest Builders of Heavy-Duty Air-Cooled Engines

—another LANSING Trailer Mixer

Little Giant

. This handy, economical small mixer will mix two cu. ft., per batch, approximately one wheelbarrow full. Of all-steel construction, securely bolted, braced and riveted.

SPECIFICATIONS

Length 72", width 36"; 1-h.p. air-cooled engine; drum diameter 22", depth 26"; shoveling height 36"; wheels 16", roller bearing, pneumatic tires. Weight—325 lbs.

Write for prices and details

LANSING COMPANY
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3-WHEEL ROLLERS
TRENCH ROLLERS

THE BUFFALO-SPRINGFIELD ROLLER CO.
SPRINGFIELD, OHIO

Roadside Job Aided By Ingenious Tools

(*Continued from page 20*)

in" operations which often cause injury to plants. As a result of careful handling of these plants, only 33 shrubs failed out of 1,668 trees and shrubs planted, or a survival percentage of 98.03. A 2-ton International truck with a 1,000-gallon water tank equipped with a power take-off pump was used for watering the trees, shrubs and sodded areas.

Contractor's Contribution

In addition to the ingenious special tools devised by W. A. Corbett to produce better results on this job, he made several other outstanding contributions. In nominating him for one of the 1940 Roadside Development Awards, J. R. Keith, Resident Engineer, and Maurice J. Day, Roadside Improvement Engineer, Oklahoma State Highway Commission, stated that Mr. Corbett showed throughout the job an exceptional willingness to do anything for the betterment of the work, often at his own suggestion and at his own expense.

For example, he suggested and built, at his own expense, numerous small ditch checks in eroded ditches. These were built of native stone, secured on the job, and laid up by hand, then covered on the up-stream side with top soil and sodded. Of this work only the sodding was paid for by the State. He also cut surface ditches at the top of all back slopes which were subject to erosion. This was not called for on the plans and Corbett received no compensation for this work.

It was also mentioned that the contractor's personnel were unusually competent and that there were more skilled men and specialists on this job than are ordinarily found on work of this type.

Meet the Winner

W. A. Corbett, contractor for this Oklahoma roadside development project and winner of both the National and Southern Section Awards of the 1940 Contractors and Engineers Monthly Roadside Development Awards for highway contractors, wrote in reply to the announcement that he had won the Award:

"I am proud to receive this Award from such a distinguished group of judges, especially since the work for which the Award was made was performed under my first contract with the Oklahoma State Highway Commission. . . . . I really did my best, hoping for future work with the State. I believe that I have been well paid for my efforts, having gained such national recognition through your contest."

Mr. Corbett, whose home is in Norman, Okla., has had considerable experience in the general contracting business, having been connected with Bailey-Burns Construction Co. of Norman, in both field and office capacities, from 1925 to 1934, and with the Manhattan Construction Co. of Muskogee, Okla., from 1934 to 1938 where his work was carried on in Oklahoma, Louisiana and Texas. In 1939 he organized his own company, the W. A. Corbett Construction Co., and plans to devote his efforts to highway work, both construction and roadside development.

Since 1925 Mr. Corbett has been indirectly associated with the Oklahoma City Branch of the A.G.C. and has been a member of the Highway Division of that organization since 1939. He is also a member of the American Road Builders' Association.

In his spare time, Corbett follows his hobbies of fishing and hunting in the Kiamichi Mountains of Southern Oklahoma.

Presentation of this and the other Awards will be made this month at the Associated General Contractors Convention in Houston, Texas.

Crawler Cranes and New Shovel Described

Coinciding with the appearance on the market of the new P & H 255-A excavator is the publication of a 24-page booklet describing the machine, issued by the Harnischfeger Corp., Milwaukee, Wis. The P & H 255-A is a ¾-yard excavator featuring the new P & H hydraulic control, which makes its first appearance in the excavator field in P & H excavators up to ¾-yard capacity. The booklet, Bulletin X-71, describes the control as well as other features of the machine.

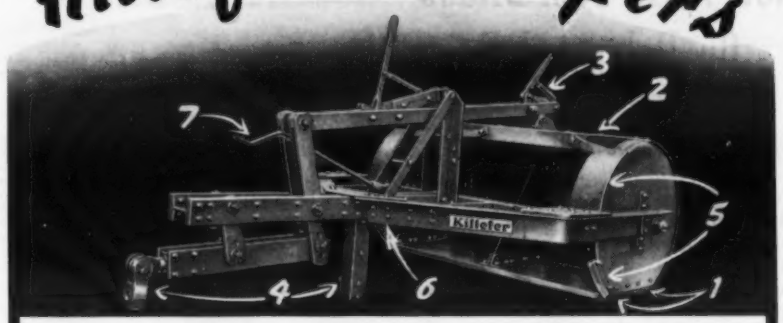
Bulletin X-78, just issued by this company, is devoted to P & H cranes with capacities from 5 to 60 tons, with supplementary material on truck cranes, switcher cranes, and other specialized equipment. Numerous installation photographs are presented to illustrate the variety of services performed by these crawler cranes in material handling.

Copies of these catalogs may be obtained by writing direct to the manufacturer and mentioning this item.

New Dealers Appointed

A. C. Harvey Co., Allston, Mass., has been appointed distributor by the Hobart Brothers Co., Troy, Ohio, to handle the Hobart line of Multi-Range arc welders in collaboration with Leo Gordon of Hobart's New England office.

Killefer Scrapers



HAVE MANY EXCLUSIVE FEATURES

Check these features and see if you can match them on any other scraper on earth: (1) Two well-braced cutting blades that can be interchanged. (2) High-back bowl plate—to insure *full loads every trip.* (3) Positive working holding latch and easy working trip latch. (4) Swivel hitch. (Parking stand on larger models.) (5) Heat-treated runner shoes and bowl-end guards. (6) Heavy gauge structural steel frame welded and hot-riveted. (7) Depth adjusting crank for controlling the cutting depth. (8) Three models and many sizes ranging in capacity from 18 to 85 cu. ft. (9) Sold and serviced by your local "Caterpillar" dealer.

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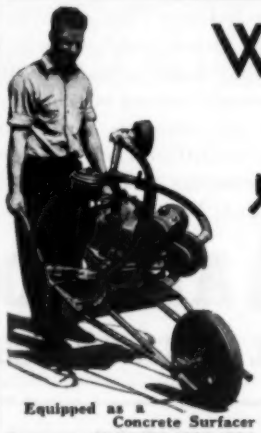

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OVER 200 gasoline engine, air and electrically operated tools and attachments to meet every requirement efficiently and economically.

Mall TRADE MARK PORTABLE POWER TOOLS

On closely figured jobs you have the advantage of lower production costs when you are equipped with these powerful, efficient tools that save on power, time, labor, material and still leave a substantial margin for profit. The popular priced 3 H.P. Vibrator, shown above, operates all day on 1½ to 2 gallons of gasoline and is adaptable to all types of concrete construction. It assures greater density and watertightness, lower absorption, better bond with reinforcement, less volume change and earlier stripping of forms. Attachments can be furnished for *Surfacing, Sawing, Sanding, Wire Brushing, Grinding, Pumping, Drilling and Sharpening Tools.*

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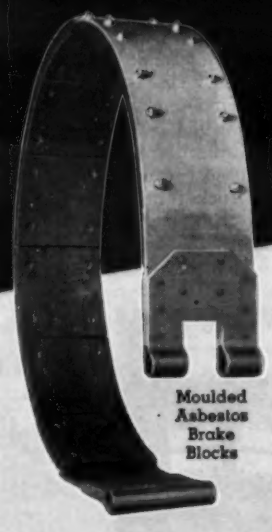

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Licking tough friction jobs is GATKE'S Business.

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Tremendous Development Facilities *work* the year around *perfecting BETTER* and *BETTER* Materials.

Whatever your service, *we have what it takes* to do the job BETTER and *will* guarantee results.

GATKE Moulded Fabric BEARINGS do the Impossible Write for Facts

Just *tell* us what you need.

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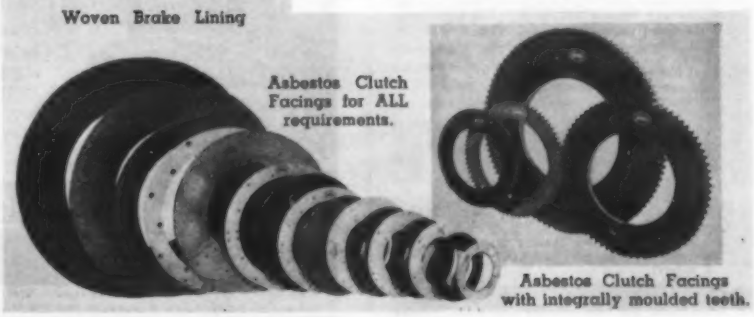

Asbestos Clutch Facings for ALL requirements.

Asbestos Clutch Facings with integrally moulded teeth.

The toll plaza and administration building for the Susquehanna River Bridge at the east, or Perryville, end.

New 7,613-Foot Bridge On Relocated Route

(*Continued from page* 15)

equipped with two toll booths, making a total of six toll booths and eight traffic lanes. Vertical clearance under the canopy is 14 feet 0 inches. The two outside lanes in the clear are for vehicular equipment of greater height than this clearance. The administration building for the operation of the bridge is located at the plaza in such a position that the Superintendent has full vision of the toll-taking operations.

The toll collection equipment consists of the following principal parts: automatic treadle; classification key box; operator's identification key; recording machines; classification indicator; and fare indicator.

The automatic treadle, which can be operated at all times, is set flush in the road and counts the number of axles passing over it in either direction. It is so made that any accidental pressure upon it, other than by a rolling wheel, is not counted.

The classification key box is composed of 10 classification buttons representing all the toll classifications used and becomes operative only when the toll officer's identification key is inserted and allowed to remain in the key box. The recording machine is located in the Administration Building and consists of a series of counters, one for each toll classification, one for the forward movement of traffic over the automatic treadle, one for reverse movement of traffic over the treadle, an automatic dating and timing device and a recorder for the operator's key number. There is one recording machine for each of the regular toll lanes. The recording machines print hourly or when the operator's identification key is inserted or withdrawn from the classification key box, the recording of each counter, the date, time and operator's key number.

The classification indicator is a series of lights on the face of each toll collection booth visible in all directions and arranged so that the classification number of each type of vehicle, as recorded by the toll collection officer on the classification key box, is visible to the toll sergeant on the toll plaza or anyone in the Administration Building.

The fare indicator is located in a window of each toll booth and serves to indicate to the patron the amount of fare that has been registered by the toll collecting officer.

The following rates of toll are charged:

Class No.	Type of Vehicles	Cash or Script Rate	Commutation Rate
No. 1	Passenger cars	$0.20	See Class 2
	Taxicabs	0.20	
	Ambulances	0.20	
	Hearse and funeral vehicles	0.30	
	Horse-drawn vehicles (2-horse)	0.20	
	Local school buses on scheduled runs	0.20	
	Local buses on scheduled runs	0.20	
	Light panel trucks	0.20	
	Station wagons	0.20	
	Pick-up trucks	0.20	
	Motorcycles	0.20	
No. 2	All of Classification No. 1	See Class 1	$0.15
No. 3	Trucks less than 2½ tons, other than those in Class 1 (2-axle)	0.25	None
	Tractors (2-axle)	0.25	None
No. 4	Trucks 2½ to 4½ tons (2-axle)	0.30	None
	Horse-drawn vehicles (more than 2 horses)	0.30	None
	Through buses (2-axle)	0.30	None
No. 5	Trucks over 4½ tons (2-axle)	0.40	None
No. 6	Trucks less than 2½ tons (3-axle)	0.25	None
No. 7	Trucks 2½ to 4½ tons (3-axle)	0.30	None
	Passenger cars and semi-trailers (3-axle)	0.30	None
	Through buses (3-axle)	0.30	None
No. 8	Trucks over 4½ tons (3-axle)	0.60	None
	Tractors and semi-trailers (3-axle)	0.40	None
No. 9	Unusual vehicles—		
	Tractors and trailers (4-axle)	0.65	None
	Passenger cars and trailers (4-axle)	0.40	None
	Power shovels, contractors' equipment and machinery; Tractors and semi-trailers and trailers carrying unusual heavy loads; All vehicles and equipment with more than 4 axles	Other vehicles in this classification pay an inspection charge of $1.00 plus $0.10/ton up to 20 tons, and $0.20/ton for each ton over 20 tons	
No. 10	Free vehicles	None	None

It was estimated there would be an average of 2,340,000 cars annually with an annual gross revenue of $423,000. The revenue from August 28 to November 20, 1940, was $165,352 from 730,000 vehicles.

The proposed personnel for operation of the bridge and toll plazas is as follows:

1 Superintendent	Full time
1 Auditor	Part time
1 Cashier	Full time
1 Steno-Clerk	Full time
7 Toll officers	Full time
4 Toll sergeants	Full time
1 Janitor	Full time
1 Mechanic	Full time

Construction of Bridge

Borings made to determine the foundation conditions showed the entire site of the bridge to be underlaid with a dense gray granite, covered by varying thicknesses of sand in the channel section and by various other strata on the island and shore sections. The subsurface exploration resulted in a decision to extend the piers to rock, except in the case of river piers where the rock was excessively deep and pile foundations were adopted. Open cofferdams were used for removing the overburden at those piers which were to be founded on rock. Cofferdams rather than caissons were used because of the irregularity of the rock foundation. The dams were made with steel sheet piling, using steel I beams for wales. Any seams or fissures disclosed when the rock was uncovered were sealed with concrete grout. In those pier sites where the overburden was too heavy to permit economical removal, steel piles were driven and the piers constructed in the same manner as those founded on rock, from the piles up.

The structural steel in the approach spans was erected by a traveler, while the steel in the channel spans was erected from a derrick barge. The anchor sections of the trusses were erected on the piers, using false columns for support, and the cantilever sections, weighing approximately 100 tons, were shop-fabricated and lifted into place from the derrick barge. All trusses were of Wickert design.

The piers are faced with granite between Elev. 6.0 and Elev. +12.0 because of the severe ice conditions which occur at intervals in the Susquehanna River. The roadway of the bridge is of Reliance steel mesh flooring filled with concrete and presents the appearance of a concrete roadway surface. In the design of the bridge, the weight of the floor included an allowance for a 2-inch bituminous wearing surface in the future.

Contracts for the Work

The construction of the bridge was divided into various contracts, the first of which was awarded to the Kaufman

(*Concluded on next page*)

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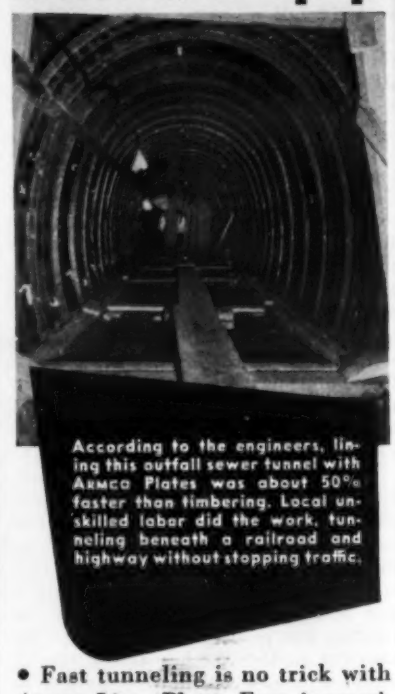
According to the engineers, lining this outfall sewer tunnel with ARMCO Plates was about 50% faster than timbering. Local unskilled labor did the work, tunneling beneath a railroad and highway without stopping traffic.

• Fast tunneling is no trick with ARMCO Liner Plates. Even inexperienced crews can install them quickly and economically. One man easily handles the strong, light weight metal sections, bolting them together with ordinary wrenches. Work moves fast and costs are low.

On a strength-weight basis ARMCO Plates cost less than any four-flanged type. In many cases you actually buy fewer ARMCO plates because their great strength permits the use of alternate rings in partially self-supporting ground. You'll save even more by ordering ARMCO Plates to fit the job. There's a type and gage to meet every condition. Excess weight is out.

Try ARMCO Liner Plates on your next tunnel. Other contractors and engineers find them a big help in "holing through" ahead of schedule and under the estimate. Write for prices and complete facts. ARMCO DRAINAGE PRODUCTS ASSOCIATION, 505 Curtis Street, Middletown, Ohio.

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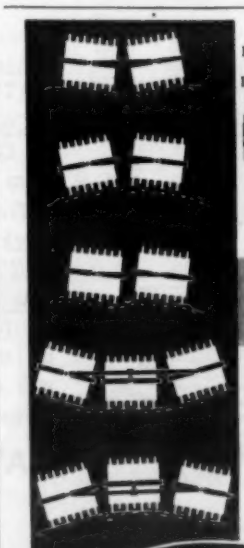

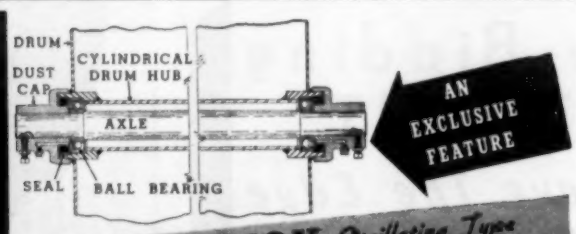

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• Illustrated above is the *through drum shaft —with sealed bearings*, an exclusive feature which means better performance and longer life from Blaw-Knox TAMPING ROLLERS.

Blaw-Knox pioneered the Tamping Roller for compacting earth fills—introduced the *double acting spring hitch* to absorb shocks, the feature of *easily renewable tamping feet.*

Blaw-Knox Tamping Rollers are designed interchangeably so that they can be used single, double, three abreast, double roller in front and single roller behind, etc. They are sturdily built for long life under hard service conditions.

The roller drums are free to oscillate to conform to all ground contours

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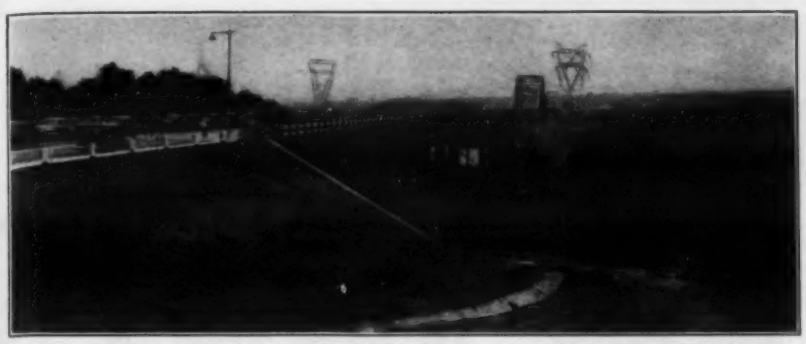

The west end of the bridge over the Susquehanna on U. S. 40 at Havre de Grace, Md.

New Maryland Bridge Recently Completed

(*Continued from preceding page*)

Construction Co. of Philadelphia, Penna., for $18,415.00. It included the preparation of the west approach, construction of three reinforced-concrete culverts, relocation of a stream bed, and the removal of various buildings within the right-of-way. This job involved 7,855 cubic yards of excavation, 385 cubic yards of concrete, and 27 tons of reinforcing steel. Work was started on December 5, 1938, and was completed on May 4, 1939.

The second contract for the entire substructure of the bridge was awarded to Robert C. Reitz of Lancaster, Penna., who started the work but defaulted and the job was completed by the McLean Contracting Co., Baltimore, Md., for $968,712.00. This contract included 10,730 cubic yards of common excavation, 26,000 cubic yards of wet excavation, 1,400 cubic yards of under-water rock excavation, 8,000 cubic yards of tremie concrete, 21,915 cubic yards of substructure concrete, 750 tons of reinforcing steel, 25,500 linear feet of steel piles, and 36,500 cubic feet of granite facing. All of the river piers were carried down to rock foundation except in a few cases where the rock was excessively deep, in which cases steel pile foundations were used. The river piers were built in open steel sheet piling cofferdams. On Garrett Island a number of the piers were set on 54-inch diameter caissons driven to a solid foundation. The work on the substructure was started on March 1, 1939, and completed on January 14, 1940.

The third contract was for the entire superstructure and was awarded to the Bethlehem Steel Co. at a sum of $2,469,300.00. This contract covered furnishing, fabrication, erection and painting of the steel superstructure, the concrete fill for the roadway and the completion of the pilaster piers above the bridge shoes. Work was started on September 1, 1939, and was scheduled to be finished on June 30, 1940, but the painting of the steel has not yet been completed. This contract called for approximately 15,000 tons of structural steel and castings, 1,340 cubic yards of concrete, 344,500 square feet of concrete filled roadway, and 58 tons of reinforcing steel bars.

The fourth contract for the toll collection facilities and administration building was awarded to the Davis Construction Co. of Baltimore, Md., for $102,655.00 and covered the construction of the toll collection booths, administration building and garage, a sewage disposal system, facilities tunnels connecting the administration building and toll collection booths, and all toll collection equipment. This work was started on January 12, 1940, and was completed June 30, 1940. The administration building is a reinforced-concrete structure, and the toll booths and canopy are of framed steel covered with porcelain enameled metal.

The fifth contract, awarded to Thomas, Bennett & Hunter at the bid price of $94,137.25, was for paving and landscaping the bridge approaches and involved 32,505 square yards of reinforced-concrete pavement, 5,100 cubic yards of excavation, 24,000 square feet of sidewalk, landscaping and other contingent items. This work was started on May 18, 1940, and was completed July 31, 1940.

The sixth contract was for the lighting of the approaches and toll plaza and the installation of navigation lights. The Simpson Electrical Co. was the low bidder at $27,300. Work was started May 20, 1940, and completed August 2, 1940.

Personnel

The Susquehanna River Bridge was designed by the J. E. Greiner Co., Consulting Engineers, Baltimore, Md. Russell Allen was Project Engineer and B. W. LeSueur was Resident Engineer. The Maryland State Roads Commission is headed by Major Ezra B. Whitman, Chairman, and Commissioners P. W. Webb and W. Frank Thomas. Wilson T. Ballard is Chief Engineer.

New Small Mitre Box Aids Cutting Forms

A pressed cold-rolled steel mitre box mounted on a waterproofed, laminated ply-wood base, and carefully fitted for smooth operation and accurate cutting has been announced by Skilsaw, Inc., 4769 Winnemac Ave., Chicago, Ill. Originally intended as an automatic roof framer, the mitre box has many applications in the cutting of lumber for the more complicated concrete forms. It is made for either a Model 77 or Model 87 Skilsaw and enables a carpenter to make all cuts in 2 x 4 and 4 x 6 lumber.

For greatest convenience in handling, the Skilsaw Automatic Mitre Box is mounted on a work bench alongside the lumber to be cut. Such a bench is easily set up on horses on the job, providing plenty of working space and making it easy to handle long pieces of lumber.

Full details on the mitre box, which eliminates the use of the steel square as it contains an etched steel protractor scale, will be found on page 10 of the Skilsaw catalog which will be sent promptly on request to those mentioning this item.

A Skilsaw in the automatic roof framer set for making a compound mitre cut.

Personnel Changes

The American Locomotive Co., 30 Church St., New York City, announced recently the appointment of Joseph B. Ennis, formerly Vice President in charge of Engineering, as Senior Vice President of the company. James E. Davenport has been appointed to the position vacated by Mr. Ennis.

SAND'S-STEVENS
Line & Surface LEVEL

Endorsed and Adopted by Road Builders and Contractors

Level is easily and quickly attached to line. Special feature construction prevents accidental detachment from line. Construction is sturdy, and accuracy guaranteed.

SAND'S LEVEL & TOOL CO.
8531 Gratiot Ave. Detroit, Mich.

"WE USE 'EM FOR EVERYTHING"
Says Winnebago County, Ill.

"We clean ditches, load trucks and perform a lot of other operations formerly done by hand. We have one 3 years old and have just bought another. When we have a little job across the county, it's a simple matter to run the tractor front-end loader on a truck and get over there in a hurry. They certainly work out fine."

LOADING—Full ½-yard bucket loads solid dirt, clay or gravel into trucks at rate of 30 to 40 yards an hour... 40 to 50 yards working from stockpiles. Also available; 1-yard bucket for handling light material such as snow or fertilizer.

BACKFILLING — Bucket may be removed and replaced with a backfiller or angle backfiller blade or snow plow in a few minutes. Drawbar always free. Choice of flat track shoes or grousers.

TRANSPORT BUGGY — An easy, quick and safe way to transport shovel from job to job. One man mounts shovel on the wheels in a few minutes; hooks to truck and drives away. Outfit travels at truck speed.

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DIGS . . . LOADS . . . CARRIES . . . LEVELS AND SPREADS . . . QUICKLY TRANSPORTED

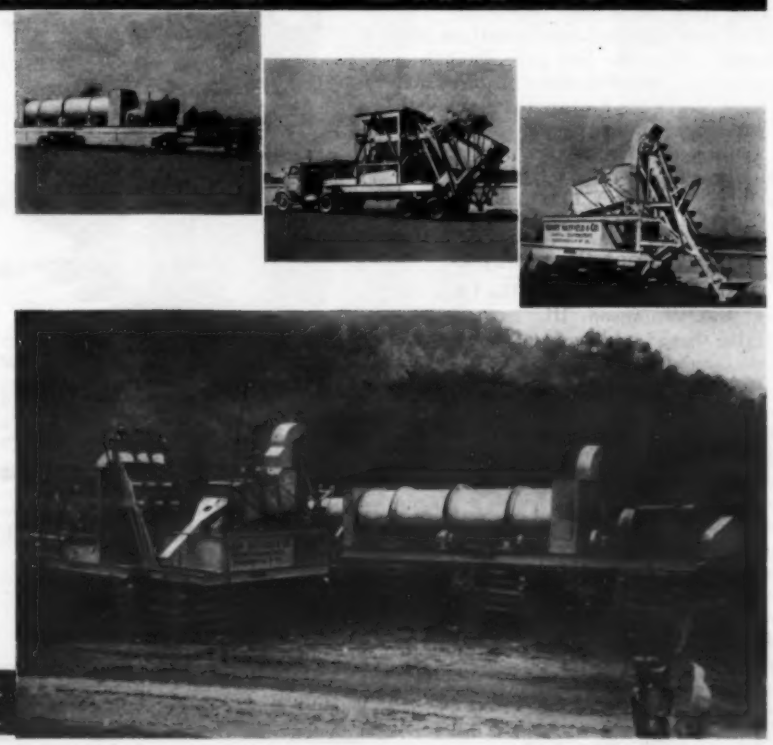
ALLIS-CHALMERS
TRACTOR DIVISION—MILWAUKEE, U.S.A.

ASPHALT MIXING PLANTS

Portability and large capacity go hand in hand in the new Model M-H Bituminous Batch Mix plant. Three wheel mounted units, two of which may be hauled by any standard tractor—are easily moved and set up on small tonnage jobs. Ample capacity is provided by full size 2500# pug mill mixer. Will meet most State and Federal specifications for standard bituminous mixes.

Stationary and gravity type portable plants are also available in batch capacities of 300# to 8000#.

Further details upon request.



HETHERINGTON & BERNER INC.
ENGINEERS AND MANUFACTURERS

C. & E. M. Photo

New A.E.D. Officers Elected at Meeting

At the annual meeting of the Associated Equipment Distributors, held in New York City on January 27, the following officers were elected for 1941: President, W. G. Morgan, Geo. F. Smith Co., Inc., St. Louis, Mo.; First Vice President, T. W. Harron, Harron, Rickard & McCone Co., San Francisco; Second Vice President, E. P. Phillips, Phillips Machinery Co., Richmond, Va.; and R. R. Nixon, Nixon-Hasselle Co., Inc., Chattanooga, Tenn., Treasurer. The Board of Directors includes T. B. Holmes, Holmes-Talcott Co., Hartford, Conn.; H. O. Penn, H. O. Penn Machinery Co., New York City; Harry Shaw, Service Supply Corp., Philadelphia; E. P. Phillips, Phillips Machinery Co., Richmond; A. E. Hahnen, Tractor & Machinery Co., Atlanta, Ga.; Reed Wilson, Wilson Machinery & Supply Co., Lexington, Ky.; Byron Patten, Patten Tractor & Equipment Co., Chicago; G. W. Van Keppel, G. W. Van Keppel Co., Kansas City, Mo.; W. G. Morgan, Geo. F. Smith Co., Inc., St. Louis; A. L. Lott, Conley-Lott-Nichols Machinery Co., Dallas; T. W. Harron, Harron, Rickard & McCone Co., San Francisco; and Elmer Schoen, Pacific Hoist & Derrick Co., Seattle, Wash.

The Board of Governors consists of A. F. Sersanous, Loggers & Contractors Machinery Co., Portland, Oregon, as Chairman; Carl Baker, Smith Booth Usher Co., Los Angeles; Fred W. Mattheis, Hedge & Mattheis Co., Boston; J. S. Gilman, Wm. H. Ziegler Co., Inc., Minneapolis; Morton R. Hunter, Hunter Tractor & Machinery Co., Milwaukee; G. F. Lowe, Lowe Machinery Co., Chicago; and R. R. Nixon, Nixon-Hasselle Co., Inc., Chattanooga.

The accompanying photograph was taken at the organization's annual luncheon with the manufacturers at the Hotel Commodore, New York City.

New Air-Driven Plug Busts Boulders Fast

The "plug and feather" has served quarrymen for countless generations, but a newly designed adaptation, made by the Marcrome Mfg. Co., 1200 North Rock Hill Rd., St. Louis, Mo., and known as the Maloney Boulder Buster, has modernized this device effectively. The Boulder Buster is an integral unit of specially treated steel, the plug, operating in moveable slides, the feathers, which expand in parallel lines against the inner surface of the drilled hole resulting in an immediate breakage.

All that is necessary is to drill a hole in the boulder or oversize rock with a pneumatic drill. Then the Buster is inserted in the hole and driven down with a pneumatic hammer or by hand if desired. It offers considerable saving in caps and dynamite alone for mud capping, and in street, open sewer and subway work it eliminates the hazards of shooting in congested districts.

The cost of the Maloney Boulder Buster is small and it is made in a 1½-inch size for a 1⅝-inch hole. Complete information will be furnished promptly by the manufacturer to those mentioning this item.

Motor and Engine-Driven Welders and Generators

A new 12-page illustrated booklet giving facts about motor and engine-driven welders and their operation, and bare welding generators is announced by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Penna. Information contained includes dimensions, weights, ratings and applications for various types of machines, and a general description of each. Fourteen characteristic curves, covering all the general types, are a feature of this booklet, and give interesting data on welder operation. Optional and standard equipment are discussed and on the last page there is a summary of the distinctive features and advantages of the Flexarc line, each with a brief explanatory sentence.

Copies of Descriptive Data 26-100 may be obtained direct from the manufacturer, Dept. 7-N-20.

Low Cost Pavements

The Asphalt Division of The Ohio Oil Co., Inc., Robinson, Ill., has issued a catalog that should be of interest to state and county highway engineers interested in low-cost road construction. According to this company, the Lincolnite design for low-cost pavements has been able to retain the essential feature of high type construction, that is, close graded aggregates coated with a plastic or semi-solid asphalt, and yet use the low-cost materials and methods that have been developed in this field. In addition to general information on bituminous pavements, this catalog gives sequence of work for constructing Lincolnite road-mix and traveling plant-mix pavements, Lincolnite surface treatment, and various useful tables and graphs covering the asphalt and aggregates used.

Drinking Fountain For Use on the Job

A supply of cool clean drinking water under sanitary conditions to large or small crews of workmen on construction jobs can be supplied by the Dobbins portable drinking fountain made by the Dobbins Mfg. Co., Elkhart, Ind. The water is sealed from dust and dirt and the men are protected from the spread of infectious and contagious diseases. In addition there is attached to the fountain a Dobbins salt tablet dispenser, with a capacity of 500 tablets, to insure the health and energy of the workmen during very hot weather.

The water container is constructed of heavy corrosion-proof stainless steel, with the outside jacket made of galvanized steel, electric welded with a heavy steel reinforcing band around the bottom. A slight thumb pressure on a lever handle operates the bubbler which is of the tilting type, made of brass and heavily nickel-plated. A built-in valve keeps the water flow constant when in use. The bubbler guard is of stainless steel.

Copies of a new folder describing and illustrating the Dobbins portable drinking fountain and salt tablet dispenser may be secured by those interested direct from the manufacturer by mentioning this item.

WELDED

ROLLED STEEL CONSTRUCTION FOR GREATER STRENGTH AND SPEED

• The special welded construction formerly used only in custom-built buckets for extra heavy service in steel mill and dredging service is now featured throughout the entire Williams line.

Power Arm and Multiple Rope Types for Digging and Material Rehandling Dragline • Power Wheel • Dredging Steel Mill Buckets ⅜ Yd. to 16½ Yd. Capacities

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Our Welded Construction cuts down unnecessary weight—you'll do faster work—move more yardage with these Williams Buckets.
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Avoid Legal Pitfalls

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Edited by A. L. H. STREET, Attorney-at-Law.

A "Hindsight View" Of Liability Policy

Trucks and other motor vehicles have a wayward tendency to get into accidents under circumstances that lead their owners to suppose that they are protected by liability insurance carried by them, until a court convinces them that the insurance company is in the clear.

Take, for example, the case of Speca v. Bucci Construction Co., 11 Atl. 2d, 560. The contracting company's truck was covered by a liability policy, but the policy contained a clause to the effect that it should not cover the truck if used in towing a trailer, unless there was a rider on the policy permitting such use, or unless the trailer was insured by the insurance company. While the truck was towing a two-wheel trailer, a collision with an automobile occurred.

The Pennsylvania Superior Court decided that, since there was no rider on the policy and since the trailer was not insured, the policy did not protect the contracting company. The court followed a decision of the California District Court of Appeal, to the effect that it made no difference whether or not the trailer was the cause of the collision.

The Pennsylvania court also decided that it made no difference that the trailer was being towed by the truck as freight, for future use in the company's business, as was another trailer of like kind that was carried in the body of the truck. The trailer was a trailer "for a' that"!

All of which goes to show that it is cheaper and more satisfactory to find out what a liability policy covers *before* there is an accident than afterward.

Responsibility to Public

Bridge and highway contractors may profit in the future by drawing up their chairs and listening to what happened in a Mississippi case.

In repairing the flooring of a highway bridge, the contractor removed wheel guards and guard rails, but failed to replace them in as secure condition as they were before he removed them. After the job was completed an automobile ran through a wheel guard and guard rail and fell from the bridge.

The Mississippi Supreme Court decided that the facts of the case justified recovery of damages against the contractor by a passenger in the car (Holmes v. T. M. Strider & Co., 189 So. 518.) The following declaration by the court deserves being pasted in every public contractor's hat:

"After the contractor has turned the work over and it has been accepted by a public board or commission as satisfactory, the contractor incurs no further liability to third parties, by reason of the condition of the work, and * * * the responsibility, if any, for maintaining or using it in its defective condition, is shifted to the public board or commission. This rule, however, is subject to some qualifications, among them cases where the work is" an inherent nuisance by reason of its defective condition, "or *where it is turned over by the contractor in a manner so negligently defective as to be imminently dangerous to third persons.*"

The court also decided that not even the consent of the engineer in charge of the job will excuse a contractor from responsibility for leaving the work in a dangerous condition.

Effect of Conditional Bids

Not even Uncle Sam has a right to treat a conditional bid for a public construction job as an unconditional one—not even if instructions to bidders forbid conditional bids.

A levee contractor unconditionally bid a certain figure on each of three items of work, aggregating $136,000. The contractor made a separate bid of $108,000 on the entire job, on condition that that bid should be disregarded if the first bid was the lowest proposal on two of the items of work. The contractor was low on the unconditional bid, but the Government engineer treated the conditional bid as absolute and insisted on a contract at $108,000. When the bidder refused to sign up, the contract was awarded to the next lowest bidder, at $156,000; the first bidder being notified that it would be held liable to the Government for the increased cost of the job.

In Noce v. Edward E. Morgan Co., 106 Fed. 2d, 746, the United States Circuit Court of Appeals, Eighth Circuit, decided that the engineer could not convert a conditional bid into an unconditional one and was subject to injunction against making any claim against the bidder on account of the conditional proposal. The court said:

"Assuming that the conditions which the plaintiff attached to its combination bid were violative of the rules for and the instructions to bidders and for that reason the defendant had the right not only to reject, but to ignore, the plaintiff's entire proposal, there was nothing in the law or in the instructions or invitation furnished the plaintiff which gave the defendant the right to disregard the conditions of the combination bid."

Lesson in Contract-Making

What a contractor learns concerning conditions affecting the performance of his contract after his bid has been accepted, but before he signs the contract, is binding upon him. If those conditions are more burdensome than he is willing to undertake, he should refuse to enter into a contract. He is bound by conditions as they appear when the contract is signed, and not by those appearing when his bid is accepted.

When a bid to construct reservoir baffle was awarded, it was mutually contemplated that the contractor could secure rock from a certain quarry under control of the state for which the job was being done. But when the contract was signed, nearly a month later, the successful bidder knew that the state did not own or control the quarry. Under such circumstances, the Massachusetts Supreme Judicial Court decided (Franklin A. Snow Co. v. Commonwealth of Massachusetts, 22 N. E. 2d, 599) that the contractor was not entitled to extra pay for the extra expense of securing rock from other quarries.

The court noted that until the contract was signed, the contractor could have refused to comply with his bid, with no greater liability, if any, than forfeiture of the check deposited as security for entry into a contract. It was further noted that the contractor did not seek to escape from the bid on the ground of mistake or otherwise. The Court said that when the contract was signed the contractor thereby bound himself to the uncertainty where he would find an available quarry.

Missing Word Causes Suit

Laymen are usually disposed to scoff at lengthy contracts, and members of a particular craft are disposed to assume that courts will unbendingly give to a trade term the same meaning commonly ascribed to it in that craft. But we could cite hundreds of court decisions to demonstrate the point that while too many words cannot cause legal trouble, unless they happen to be contradictory, the omission of one little one-syllable word from a contract can cause a lot of trouble.

Let's consider the recent case of State Highway Department v. MacDougald Construction Co., 6 S. E. 2d, 570, decided by the Georgia Supreme Court. There a highway construction contract required the contractor to use "aggregate" in surfacing the road. The contractor assumed that because "aggregate," as a construction material, is commonly understood as meaning *stone* aggregate, there was no need for including the word "stone." But while the work was in progress a dispute arose, the Highway Department contending that *slag* aggregate must be furnished. The contractor protested because that kind of surfacing was more expensive than stone aggregate construction.

The contract made the State Highway Engineer final arbitrator of all disputes connected with the execution of the contract. He ruled that, because there was on file in his office general specifications which were made a part of the contract, and because they mentioned slag construction, slag aggregate must be furnished. The Supreme Court ruled that the Engineer's decision was final, and the contractor lost a suit to recover $7,000 as extra pay. The Supreme Court reversed a contrary decision that had been reached by the Georgia Court of Appeals, a lower tribunal.

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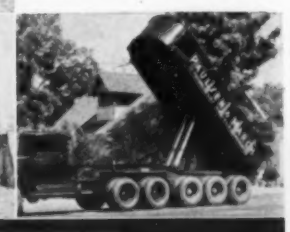
(Left) Dependable S-L type hoist and sturdy 3-yard body guarantee long life and trouble-free service.

(Lower Left) Powerful Single Cylinder Heil Telescopic Hoist dumps the 8-yard load in "jig-time."

(Below) Heil Hydraulic Hoist design insures efficient installation and operation on trailer dump units.



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Contractors and Engineers Monthly

A peace-time asset is a war-time need. Open roads in winter are not only necessary to the welfare of a nation at peace; they are a vital necessity to its defense. Here is one of Pennsylvania's battery for snow removal, a rotary plow on a Walter four-wheel-drive truck, in night action on the Benjamin Franklin Highway. See page 1.

C. & E. M. Photo

One of the fleet of [illegible] truck mixers delivering [illegible] crete to the agitator [illegible] of one of the two [illegible] crete units on the [illegible] Lakes Dredge & Dock [illegible] subcontract for concre[illegible] at Franklin Falls Dam, [illegible] See page 2.

C. & E. M. Photos

One of the county fleet of Diamond T trucks delivering crushed limestone in a measured center windrow on the base course preparatory to road-mix operations on Grassy Lick Road in Kentucky.

Rural highway projects in Kentucky are sponsored by the State Highway Department to increase the mileage of surfaced roads as connecting links between farms and cities. Montgomery County completed the 5-mile road-mix project depicted step-by-step below with stone from a WPA quarry and asphalt furnished by the state. See page 1.

C. & E. M. Photos

The Village Blacksmith takes to the road. Above, Francis Rhoades of Randolph, Vt., sharpens picks and mends chains for Littleton Construction Co. at Bethel, Vt. Right, orders to clean up the ledge before pouring concrete were taken seriously on the Bethel, Vt., underpass job. See page 11.

At right, an RD4 tractor pulling a Caterpillar 33 grader spreading the windrow of crushed stone into a flattened windrow ready to be shot with asphalt. The stone was kept a uniform thickness.

A delayed start, difficult rock and long hauls failed to prevent the scheduled completion of the work on Ralph Myers' 2.09-mile grading job near Kittanning, Penna., involving 410,345 cubic yards of shale and rock excavation. The job divided itself rather naturally into 1,000-foot sections, and was run three 8-hour shifts a day. See page 2.

At left, the 800-gallon county asp[illegible] distributor applying 0.75 gallon[illegible] Texaco asphalt to the 14-foot flatt[illegible] windrow. The distributor hauled [illegible] binder 4 miles from the county [illegible] to the job.

C. & E. M. Photos

Below, pulling the stone with the [illegible] phalt to the center of the road, [illegible] first step in the road-mix opera[illegible] The work was done in 650-[illegible] lengths, this being set by the ca[illegible] ity of the distributor.

Above, loading a 13-yard Euclid Trac-Trak with a Lorain 87 and an Amsco bucket in a long shale cut on Ralph Myers' grading job near Kittanning, Penna., while, at right, Carryalls widen a cut to secure borrow and thus avoid a long haul.

C. & E. M. Photos